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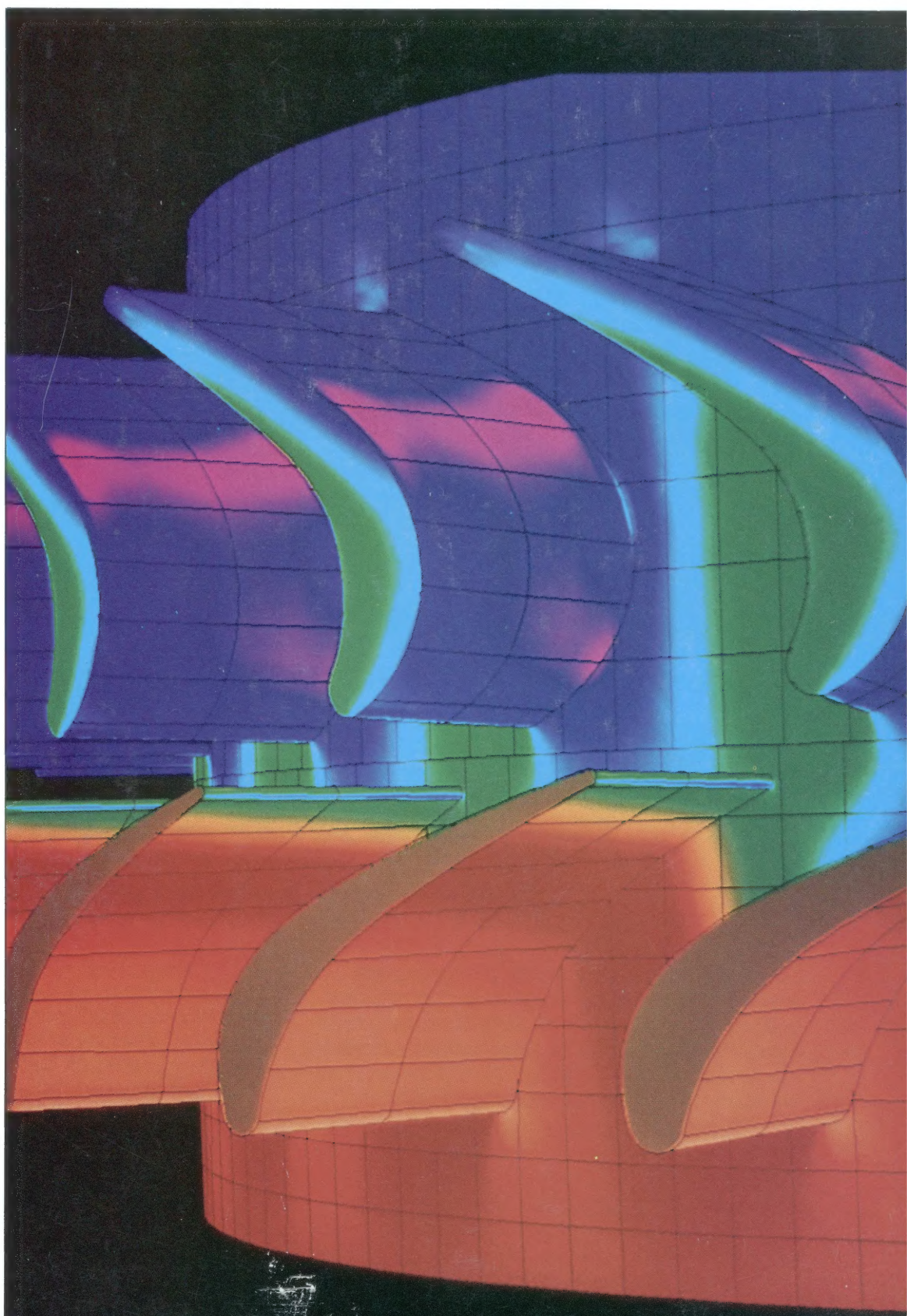
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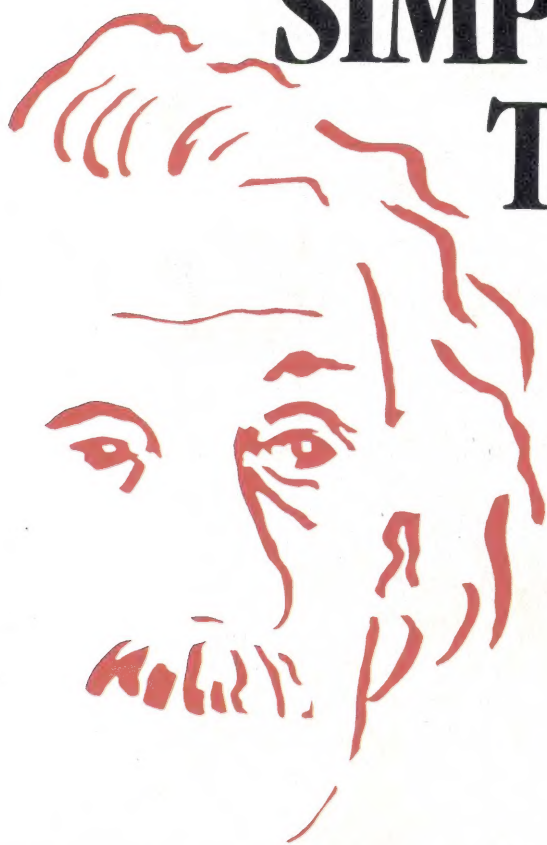
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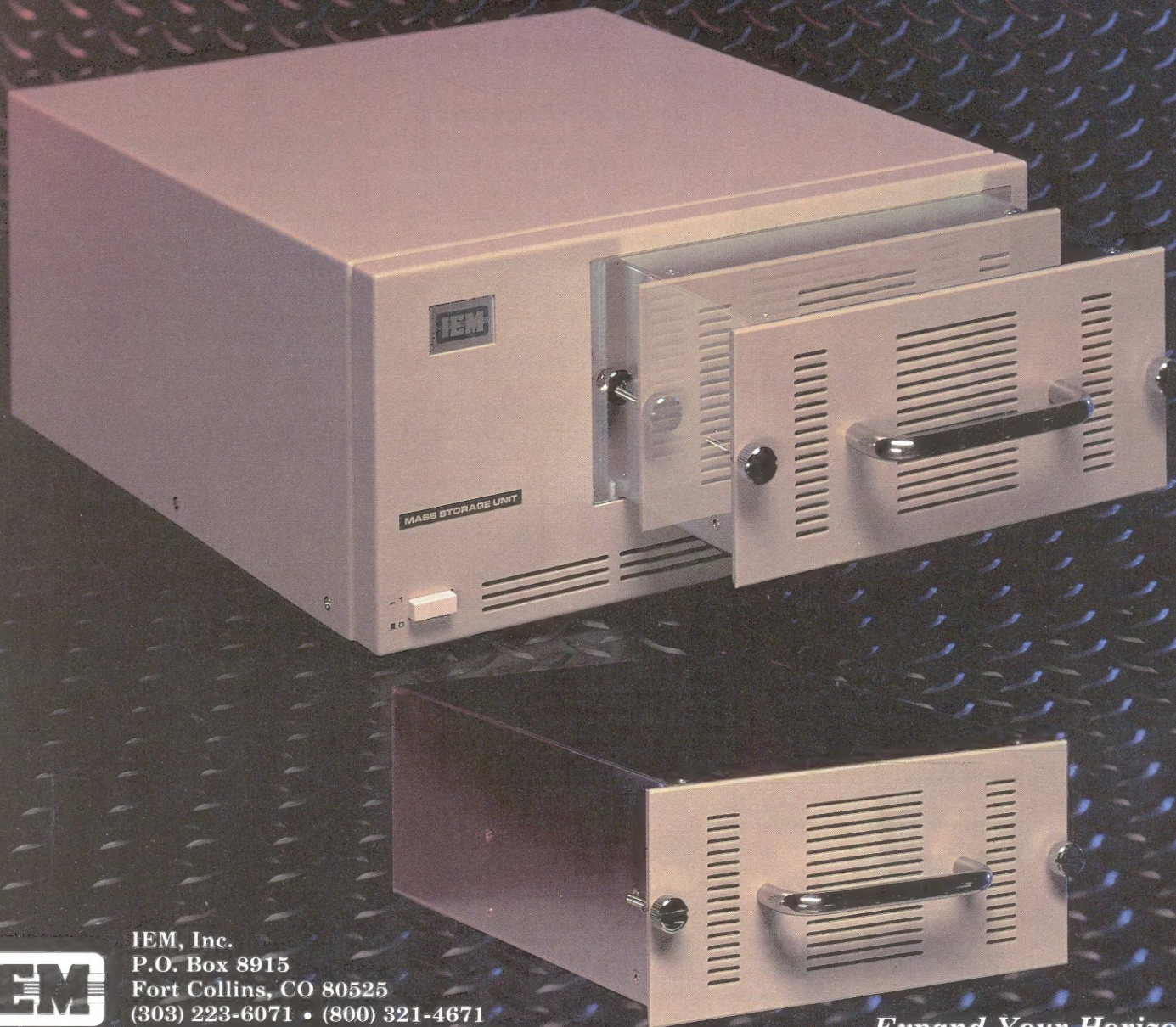
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Fluid flow dynamics.
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GRAPHICS**

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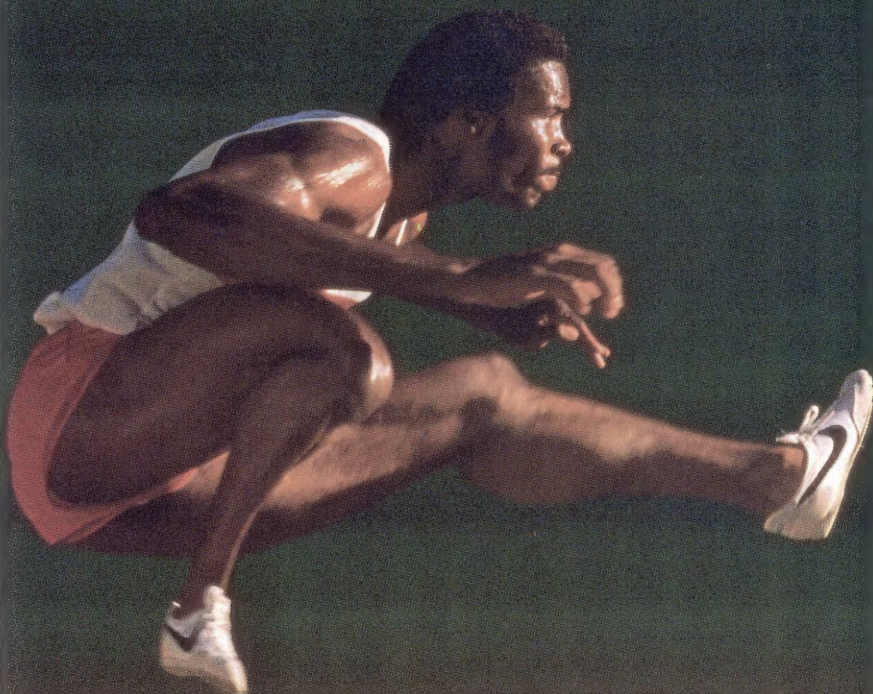
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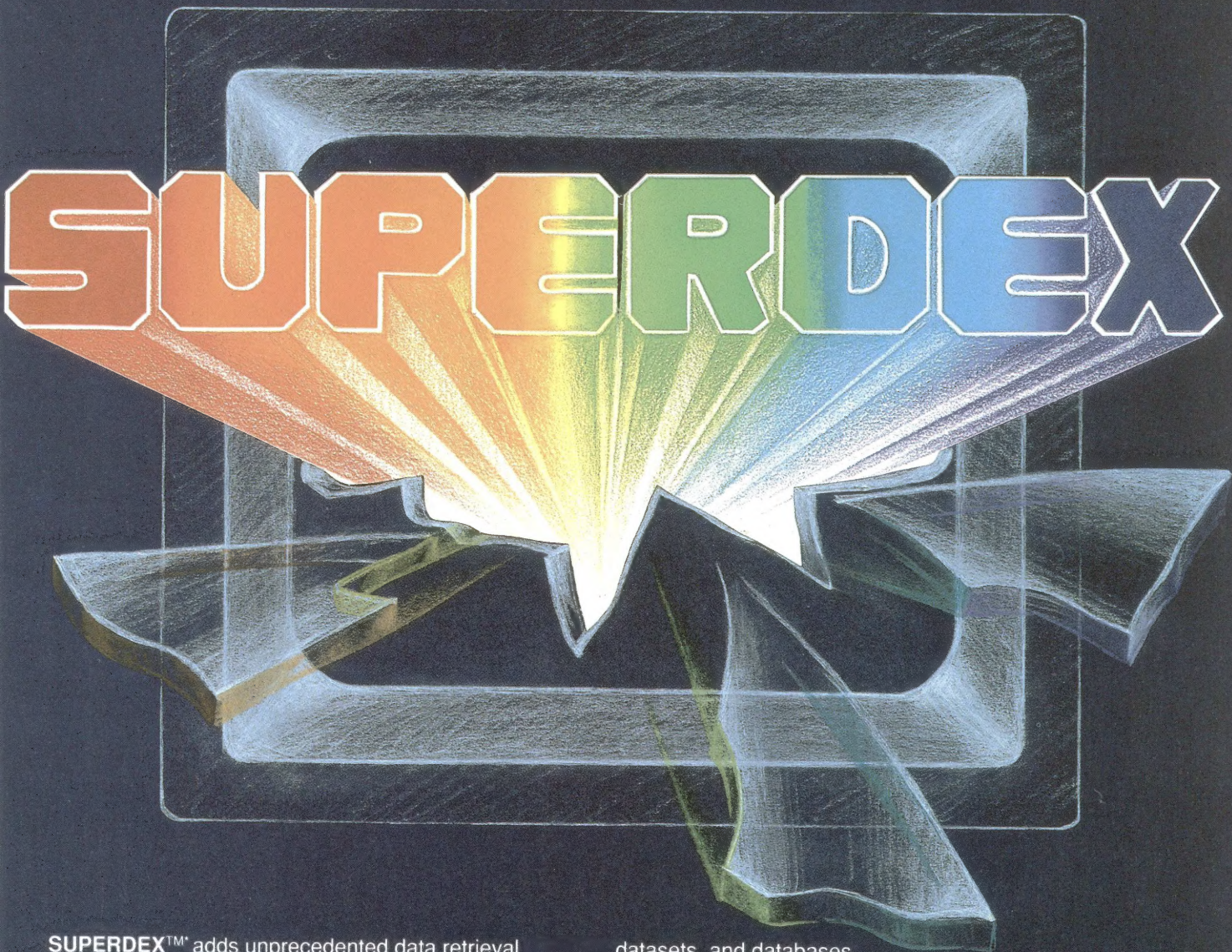
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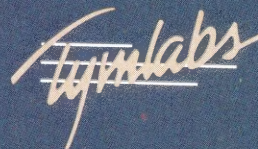
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Whoa, Horse!

Indulge me for a moment on a short tour of the X-window interface. There is more here than meets the eye, and certainly more than another sermon on UNIX. The core concept in X is that the application (called the client) totally is disconnected from the user presentation. The client communicates with the presentation (server) via a standardized bit stream that is ENTIRELY independent of the graphic specifics of the presentation device. The communication can occur within the same CPU or over a network to another CPU. Locality of the client is only relevant if the bandwidth of the network is not sufficient. The client application can be written without any regard for the internals (or the operating system!) of the server. The server uses whatever graphic smarts it may have in delivering the presentation, but will work (albeit slower) on the most humble workstation (or new generation of server terminal). It is a big mistake to tell yourself that X is only a graphic interface, and we don't do graphics. X and its emulators are USER interfaces and will bury the character oriented terminal.

This X concept is the same as the OS/2 presentation manager, which just happens to be SAA compliant. SAA is the future of IBM. At DEC, they are finishing the largest software project in the history of the company, making EVERY possible layered product and utility X compliant. The next release of VMS will deliver X windows.

Here's the philosophic pitch: the separation between client and server, between application and presentation, produces a MAJOR change in our industry. Platforms and their operating systems on the same network now are relatively irrelevant and will be chosen for their aptness for a given task. A unified user presentation across all that bedlam of operating systems effectively eliminates the problem.

If you were wondering where the push for commercial UNIX was coming from, consider that it generally is regarded as easier to ride the horse in the direction in which it is going. HP, IBM and DEC are all astride this horse, and are holding on for dear life.

Next Month . . .

- *From 3000s to 1000s*, HP Professional guides you through the maze of used equipment options available.
 - *Kathy McKittrick, at the request of HP Professional, interviews IMACS' David Dummer. Dave discusses the evolution of end-user computing in both the 3000 and PC environments.*
 - *HP Professional shows you how to save money in your HP 3000 computer room.*
- These are merely a few highlights. In addition, we'll also continue our coverage of industry news, new products, etc.



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INDUSTRY WATCH

Peggy King

HP's Fifth Annual Software Engineering Productivity Conference

The Latest In Metrics, Methods And Tools

During the first week of August, Hewlett-Packard

Only when engineers understand and learn the new methods "by hand" can technology transfer progress to the next step of providing automated tools.

Software Development Technology Lab (SDTL), under the direction of lab manager Sheryl Jamison, has the responsibility of training HP software engineers

held a conference with an attendance of over 600. The participants were software engineers and their managers from various divisions of HP who came to the Santa Clara Convention Center to attend HP's Fifth Annual Software Engineering Productivity Conference. This year's conference was the biggest ever, and the first to be held away from an HP site.

Although 35 percent of the attendees came to the Santa Clara Convention Center from around the country and other parts of the world, neither sales representatives, vendors nor members of the press were present. Although there were exhibitors with booths in the exhibit area, none of them came with plans to sell products.

This year's conference motto was "Leading the Way," and the presentations and demonstrations were grouped into three categories: metrics, methods and tools. The main purpose of bringing software engineers from throughout Hewlett-Packard together each year for a week of sessions, workshops, papers and demonstrations is to promote technology transfer.

Technology Transfer

Technology transfer is a process rather than a simple substitution of automated analysis and design methods for old coding practices. The process begins with identifying best practices in software engineering and continues with determining standards for using these methods and with teaching engineers to use new methodologies.

It is important to implement software metrics along with tools because in order to control a new method, you must be able to measure it and assess its effect on productivity.

Metrics are an essential part of the improvement process because software engineers need uniform measurements to determine the increases in productivity that result from using new software methodologies and tools.

Metrics, methods and tools are three aspects of software engineering productivity, which are linked intrinsically. In order to promote best practices, it is necessary to choose methodologies. After engineers have a thorough understanding of methods, they can use tools to automate their work. It is important to implement software metrics along with tools because in order to control a new method, you must be able to measure it and assess its effect on productivity.

Within Hewlett-Packard, there are two groups responsible for promoting technology transfer. The Software Engineering Services (SES) group, under the direction of Chuck House, general manager of Software Development Environments, is responsible for selecting the best practices and arranging training in these practices for trainers who then will train customers. The

in new methodologies and to promote the appropriate use of software engineering tools and metrics within HP.

The Conference

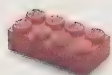
The software engineering Productivity Conference is a joint effort for SES and SDTL. The tasks shared by the two groups include coordinating the conference, choosing a committee to decide which papers will be published in the conference proceedings and arranging the booths, which are set up to demonstrate products, concepts and methodologies.

Planning for the annual Software Engineering Productivity Conference begins eight months before the event with a call for papers. This year 90 software engineers and project managers throughout HP answered the call by submitting papers to be presented at the conference. A panel of more than 40 HP employees read all the papers and selected 61 to be included in the proceedings. Some of the conference presentations

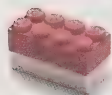
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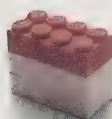


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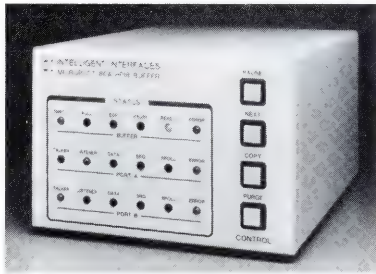
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were based on these papers and others were given by outside experts.

The six keynote speakers for the conference included Chuck House of SES and Sheryl Jamison of SDTL; Jay Richards, general manager of the Information Software Division; Lew Platt,

... the caliber of the papers submitted this year reached a new level ...

executive vice president of the Technical Systems Sector; Wim Roelandts, vice president and general manager of the Networked Systems Group and Joel Birnbaum, vice president and general manager of the Information Architecture Group. Outside presenters included Capers Jones, chairman of Software Engineering Productivity Research Inc., who presented a Friday morning session on Computer-Aided Software Engineering (CASE), and Adele Goldberg and Ted Goldstein of ParcPlac Systems Inc., who gave a session that introduced the conference attendees to object-oriented programming languages.

The Software Engineering Productivity Conference has evolved from a small gathering in a conference room to an event too well attended to be held in a place smaller than a convention center. The thickness of the Proceedings publication has more than doubled since the conference debut in 1984.

According to Brian Sakai, a project manager whose group helped to coordinate this year's conference, the caliber of the papers submitted this year reached a new level of professionalism. HP engineers wanting to attend or participate in next year's conference should plan ahead. With the continued success of the Software Engineering Productivity Conference, the waiting list for attendees will grow along with the competition for presentations and papers to be published.

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ANACOM General Corporation 1335 S. Claudina St., Anaheim, CA 92805 (714) 774-8080 FAX (714) 774-7388

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CIRCLE 133 ON READER CARD



HP Impacts Sporting World

Computers Provide A Competitive Edge

The competitors in the 1988 America's Cup yacht races represented a triumph of technology: the two fastest sailboats of their kind ever launched. The achievement of the two design teams can be measured to the degree in which they used technology as a tool. Hewlett-Packard computers provided the power for these design breakthroughs.

On board the 1988 New Zealand, HP computers were the centerpiece in the boat's performance-information systems. The computers track and analyze data gathered by more than 150 scanners built into the boat, factoring in current wind and water conditions and providing real-time feedback to maintain optimum performance. Weekend sailors soon will benefit from the commercial release of a sail design-and-analysis program developed for the 1988 race, and from an innovation in catamaran design, all supported by HP computer technology.

HP computers, calcu-

lators and measurement devices have been a key element in competitive yachting now for more than five years. In the 1987 competition for the America's Cup, 10 of the original 18 entrants used HP equipment in applications ranging from yacht design and refinement to on-board navigation.

Since 1984, HP has been

the official computer of the Association of Tennis Professionals (ATP) and the Women's International Tennis Association (WITA). HP PROMAP software running on the HP Vectra manages the business and administrative aspects of the world's major tournaments, including Wimbledon, the U.S. Open and the French Open. Tournament organizers and officials use the HP system to provide scoring information for match play, scheduling

and posting results as the tournament progresses.

Drug testing during the Tour de France and Olympic Games is standard procedure and HP instruments are used to enforce the ban on performance-enhancing drugs. In Seoul this year, HP 5890 gas chromatographs were used by the International Olympic Committee to test more than 1,500 athletes for the presence of proscribed substances, including steroids, stimulants and diuretics.

IMACS Systems Corporation Moves To Seattle

New Home Brings Expansion

IMACS Systems Corporation recently announced that its U.S. corporate offices will move from Marina del Rey, California, to Seattle, Washington, effective October 1, 1988. The new address is 2825 Eastlake Avenue E., Suite 107, Seattle, WA 98102; (206) 322-7700.

David Dummer, company president, said "We're excited by this move! The new location doubles our existing office space and gives us the room to expand our production, support and training facilities. The Seattle location promotes joint effort projects with several Seattle-based companies that have HP 3000 or PC products with which our own DataExpress product family has, or will have, an interface. In particular, we are enhancing our interfaces to Walker Richer & Quinn's Reflection for the Macintosh and to Microsoft's Excel package. We also are evaluating new communication technologies under development at WRQ and exploring their application to the DataExpress system facilities. The Seattle expansion represents a major commitment by IMACS for further research and development projects and the improvement of our product delivery and support systems. I know that both our staff and customers will benefit from this."

Circle 361 on reader card

MDSS Software Provides Connection Between PCs And Minicomputers

Provides Interactivity For PC And 3000 Users

MDSS, running on the Hewlett-Packard 3000 Series, now has the capability to move information to and from the PC using the MDSS-Personal Computer Manager Utility.

Features of the new MDSS interactivity utility include the ability for users to move information in a seamless fashion between the PC and mini. Signing on and off are not necessary. Users do not need to key into external command screens. PC-related commands do not have to be learned, and no new software package needs to be learned to transport information from mini to PC. MDSS permits the user to bring the data down while working with MDSS software. With MDSS, the user learns as few things as possible to get to the business data, and the user can provide linkage so that the PC can provide a standalone function like CAD, which can pass into and out of MDSS.

Contact MDSS, 1717 E. Ninth St., 300 E. Ohio Bldg., Cleveland, OH 44114; (216) 861-8100.

Circle 359 on reader card

Softac And Tres Associates Sign Agreement

Tres Distributor Of SOFTAC 1 And SOFNET



Softac PTY Ltd. (Sutherland, Australia) and Tres Associates (Austin, TX) have signed a joint marketing agreement whereby Tres Associates will be the exclusive U.S. distributor of Softac's HP 3000 Application Manager, SOFTAC 1, and networking option, SOFNET.

SOFTAC 1 provides a complete application run-time environment. It allows a series of menus to control all user application functions from one MPE session and provides built-in authorization controls down to the

application function level. SOFTAC 1 screens the user from MPE, but allows customized MPE command sequences to be executed, subject to authorization controls, with no syntax knowledge required by the user. Also, it provides an environment for programmers, allowing them controlled access across MPE boundaries without compromising security.

Contact Tres Associates, P.O. Box 9802-231, Austin, TX 78766; (512) 346-0904.

Circle 369 on reader card

Prolog Distributes UPTIME

Signs Agreement With Minicomputer Software Specialists

An agreement has been reached between Prolog Systems Ltd. and Minicomputer Software Specialists Inc., appointing Prolog as distributor in the UK and Europe for UPTIME, a Field Service Management System.

The UPTIME Field Service Management System is a fully-integrated software solution encompassing serv-

ice call tracking and technician dispatch, inventory control, maintenance agreements, service-order work-ticket reporting and invoicing.

Contact Prolog Systems Ltd., Dataday House, 8 Alexandra Road, Wimbledon, London, SW19-7JZ; 01-946 9633.

Circle 365 on reader card

Oracle Announces Availability Of CASE*Designer

Based On The X Window Systems

Oracle Corporation (Belmont, CA) recently announced the availability of CASE*Designer from Oracle UK. CASE*Designer, a graphical analysis and design toolset based on the X Window System can be used as a graphical interface to CASE*Dictionary (an enhanced version of SQL*Design Dictionary) and CASE*Method.

Through windows, icons and menu items selected via a mouse, CASE*Designer allows developers to create and modify entity relationship diagrams, function hierarchies and matrices. CASE*Dictionary, a database for software developers based on the Oracle distributed relational database, is a central repository for information items pertaining

to software development projects.

CASE*Method is a combination of manuals and training that includes a theoretical rule book, practice in interviewing and presentation techniques and diagrams for systems development.

CASE*Designer and the related products are available on HP 9000 Series 800 workstations. When Microsoft's Presentation Manager becomes available, personal computers including Vectra PCs will be another platform for Oracle's CASE products and methodology.

Contact Oracle Corp., 20 Davis Dr., Belmont, CA 94002; (415) 598-8000.

Circle 374 on reader card

LAN Group Int'l Signs Agreement

Distributor Of Micom Interlan Products

Micom Interlan has entered into distributor agreements with each member of LAN Group International (Chicago, IL). Under the terms of the agreement, each LAN Group member will become a distributor of Micom Interlan products to provide access for local area network resellers not served directly by Micom Interlan.

The total of each of the member contracts is estimated at \$4 million, and the relationship expands both

organizations' offerings. For Micom Interlan, the contract will allow participation with independent resellers and several international segments. LAN Group International gains access to the complete range of Micom Interlan Ethernet products.

Contact Micom Systems Inc., 155 Swanson Road, Boxborough, MA 01719; (508) 263-9929.

Circle 366 on reader card

IDE And InterACT Sign VAR Agreement

InterACT To Integrate Software Through Pictures

Interactive Development Environments (IDE) recently announced the signing of a VAR agreement with InterACT Corporation (New York, NY) allowing InterACT to integrate IDE's Software through Pictures computer-aided software engineering (CASE) tools into InterACT's System Design Environment (SDE) product line. The integrated system will be marketed by LSI Logic (Milpitas, CA).

IDE's Software through Pictures includes CASE tools that address the analysis, design and documentation of complex systems. IDE based Software through Pictures on an open architecture called Visible Connections, which allows a complete CASE environment to be

built around Software through Pictures and allows Software through Pictures to be incorporated into existing CASE environments.

While IDE addresses the early phases of the software life cycle, InterACT addresses the implementation phases by providing design tools targeted at the development of hardware-specific software. InterACT's SDE includes cross development tools (cross compilers, assemblers and linkers), simulation tools and debugging tools.

Contact IDE, 595 Market Street, 12th floor, San Francisco, CA 94105; (415) 543-0900.

Circle 368 on reader card

SPS Announces Installation Of EPOS

Available On HP 9000 Workstations

Software Products and Services Inc., (New York, NY) recently announced that the first half-dozen installations of the CASE environment EPOS on HP 9000 workstations have been delivered. EPOS provides full life-cycle support for system/software projects to increase productivity and software quality. EPOS is an integrated, open environment with development and project management support capabilities. In addition to the assistance provided in all phases (from design to maintenance, including code generation and unique code feedback features), EPOS provides general export/import capabilities to incorporate other tools or to operate in a corporate support environment.

EPOS is available for the entire DEC VAX family, Sun workstations, Apollo workstations, IBM mainframes, PC ATs and compatibles, and Data General systems, among others. EPOS specifications may be exchanged freely between your HP 9000 and these computers.

Contact SPS, 14 East 38th Street, 14th floor, New York, NY 10016; (212) 686-3790.

Circle 371 on reader card

Neuron Data And Teknowledge Sign Agreement

Teknowledge To Provide Services For NEXPERT OBJECT

Neuron Data and Teknowledge Inc., have announced an agreement under which Teknowledge will provide application development services and training courses for NEXPERT OBJECT, Neuron Data's expert system shell. Product sale will be made through Neuron Data.

Under the terms of the agreement, Teknowledge will provide applications development services based on NEXPERT OBJECT. Teknowledge also will provide specific courses on the use of NEXPERT OBJECT.

NEXPERT OBJECT is available for development

and delivery on DEC VAX-stations under VMS and ULTRIX; Sun, Hewlett-Packard and Apollo workstations; the IBM RT running AIX; and 386-based computers under the X Windows Systems Version 11; Apple Macintosh II and SE computers; and IBM PC-AT and PS/2 computers under Microsoft Windows. Delivery versions also are available for the complete DEC VAX processor line and IBM mainframe computers under VM.

Contact Neuron Data, 444 High Street, Palo Alto, CA 94301; (415) 321-4488.

Circle 364 on reader card



MAESTRO Squeezes Every Drop of Throughput From Your Batch Job Processing

Getting the most out of your batch processing while continuing to do it manually can be like squeezing water from a stone. But with MAESTRO's automated approach you'll increase your batch job throughput by an average of 35-50%.

MAESTRO allows you to realize your full production potential because it reacts instantly to a job completion, reply to a prompt, job termination, or any other significant event. This split-second response is impossible for even the most diligent operators, because they're often busy with other things like loading paper. MAESTRO's attention to detail also minimizes costly errors.

MAESTRO automatically manages a variety of tasks which are usually performed manually, such as integrating user job requests, scheduling production, preparing job streams, and documenting job status. In fact, MAESTRO is

so efficient it gives you the potential to run production completely unattended. Even if you have multiple CPU's.

We could go on and on. About saving computer time. Ease of use. Cutting personnel costs. And much more.

But all it takes is one look at MAESTRO in action. Call us today at (415) 968-7511 for a 30-day demonstration or to find out more.

"For a permanent solution, it's Unison."



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In the UK:
01-879-3797
Telex: 928536

CIRCLE 200 ON READER CARD

Theta Systems Announces Bundling Of softJET

Combined With Products By Janus Software And Orbit Enterprises

Theta Systems Corporation has announced the bundling of softJET, the HP LaserJet^{plus} screen utility, with application programs developed by Janus Software Associates Inc. and Orbit Enterprises Inc.

softJET will add its preview capability to the desktop publishing program Laser Print, text formatter SUPERPRINT and font editor

HOT LEAD all from Janus Software Associates Inc. In addition, a limited version of softJET will be bundled with Formset, the forms compiler developed by Orbit Enterprises Inc.

Contact Theta Systems Corp., #307-2150 West Broadway, Vancouver B.C., Canada V6K 4L9; (604) 732-4323.

Circle 363 on reader card

SOTAS Gains Worldwide Marketing Rights

Acquires Software International HP 3000 Product Line

SOTAS Inc. has acquired the worldwide rights to the former Software International HP 3000 financial accounting software product line from Computer Associates.

Under the terms of the agreement, SOTAS gains exclusive worldwide marketing rights to the product line and assumes full responsibility for the currently installed base of over 600 applications sites across various industries. Applications include General Ledger, Accounts Payable, Accounts Receivable, Fixed Assets, Payroll/Personnel and Human Resources.

In first quarter 1987, SOTAS began supporting the Software International HP 3000 client base and during the past 15 months has produced many upgrades to the product offering. Changes include major releases for each application; statutory releases, including compliance with the Tax Reform Act of 1986; a SOTAS/HP 3000 Support Hotline; and a continuing education staff, which conducts classes both on-site and at the SOTAS Continuing Education facility.

Contact SOTAS Inc., 192 Merrimack Street, Haverhill, MA 01830; (617) 372-0770.

Circle 362 on reader card

IEEE Approves 1003.1 POSIX

Balloting Process Complete



The Institute of Electrical and Electronics Engineers (IEEE) Standards Board recently approved the IEEE 1003.1 "Portable Operating System Interface" Standard (POSIX). The approval completes a balloting process in the IEEE Computer Society Technical Committee on operating systems that started in November 1987.

The POSIX 1003.1 Standard provides a specification for developing applications programs and computer operating systems that will provide for the portability of applications software between computer languages,

database management and computer graphics.

The POSIX standards work was started initially in 1981 by the /usr/group organization, an association for users of AT&T's UNIX operating system and similar products. The 1984 /usr/group Standard formed the basis for the IEEE 1003.1 working group, which started meeting in 1985. In 1986, a trial use POSIX Standard was published, the newly approved 1003.1 Standard represents an update and revision of that document.

H&R Block Inc. Announces Merger

Acquires Access Technology Inc.



H&R Block has announced the signing of an agreement for the acquisition of Access Technology Inc. by CompuServe, a wholly-owned subsidiary of H&R Block Inc. The proposed merger contemplates the issuance of shares of H&R Block common stock having a value of approximately \$36,750,000 in exchange for the outstanding common and preferred stock options of Access Technology Inc.

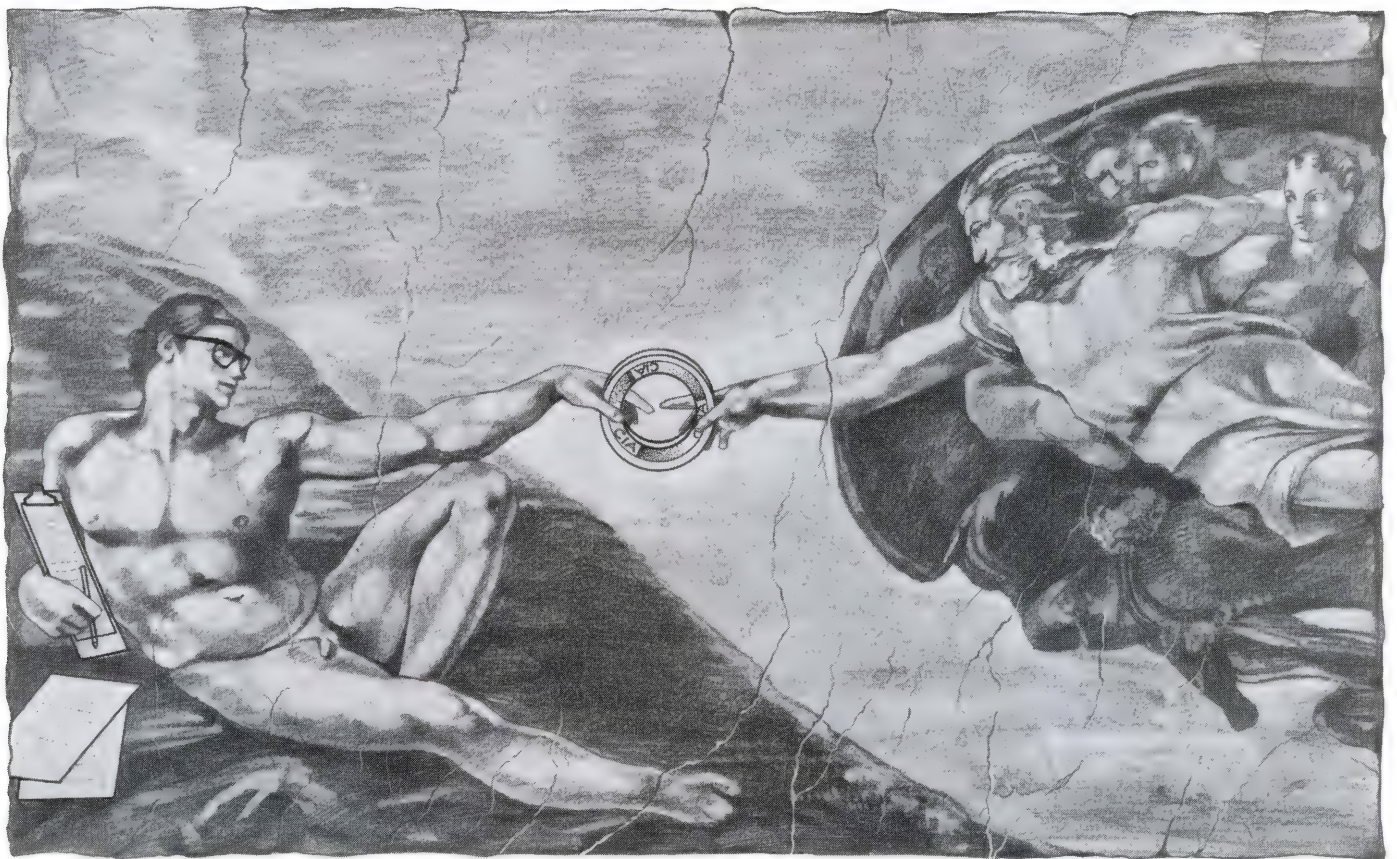
As of April 30, 1988, Access' revenues were \$18,307,000, an increase of 56.5 percent over revenues of \$11,696,000 in the prior fiscal year. Net income in fiscal 1988 was \$2,498,000, up 54

percent from \$1,622,000 in fiscal 1987.

Access Technology will be the largest component of the Software Products Division of CompuServe Inc. The division also includes CompuServe Data Technologies, which markets System 1022 database management system and system 1032 fourth-generation language and database management system to the DEC marketplace and Collier-Jackson Inc, providers of financial, human resource and newspaper software to both the DEC and Hewlett-Packard markets.

Contact Access Technology, Inc., 6 Pleasant Street, So. Natick, MA; (617) 655-9191.

Circle 375 on reader card



At last... System Performance like a gift from God.

CIA, which stands for CPU I/O Analyser, is the ultimate control over System Performance on an HP3000.

Try CIA and you'll agree that its simplicity and powers of revelation feel divine indeed.

Write, telephone or fax us for complete information including a demo tape and manual.

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Telephone +61 2 484 3979. Facsimile +61 2 484 5709.

In the USA, contact:

Tres Associates

Post Office Box 9802-231, Austin, Texas 78766.

Telephone 512 346 0904. Facsimile 512 459 9588.

FM&A/LF5

CIRCLE 108 ON READER CARD

Eurodata Announces Expansion Of Maintenance Services

Offers 30 Percent Discount

Eurodata Inc., (Ottawa, Ontario) recently announced the expansion of its hardware maintenance services to include Montreal, Quebec City and the surrounding areas.

Eurodata Support Services offers maintenance on the complete line of Hewlett-Packard computer systems, peripherals, workstations and terminals.

Local parts and personnel allow Eurodata to provide contractual coverage including four-hour and next-day response, bench repair and time and materials services.

Contact Eurodata Inc., 2574 Sheffield Road, Ottawa, Ontario K1B 3V7; (613) 745-0921.

Circle 373 on reader card

Hewlett-Packard Enters Third-Party Market

Offers Multivendor Maintenance For PCs And Peripherals

Hewlett-Packard recently announced its entrance into the multivendor-service business to provide HP and non-HP customers with company-wide service and support for personal computers, peripherals and networks made by different manufacturers.

HP's Multivendor Support Operation (MSO), which operates within the HP Worldwide Customer Support Operation (WCSO), was formed to meet increasing market demand for a single-vendor solution to manage the maintenance, service and support needs of office environments with PCs and peripherals from different vendors.

By acting as a single-source supplier of office-workstation support and service, HP will custom-design maintenance packages that provide users with a single resource for all of its hardware-, software- and local-area-network-related service support requirements.

Depending upon the terms of a customer's contract, services provided can include repair and restoration, loaner equipment, PC-software diagnosis, preventative maintenance, repair reporting, installation and relocation management and a workstation user help desk.

Contact the Hewlett-Packard Sales office listed in the white pages of your telephone directory.

Circle 367 on reader card

Reagan Signs Omnibus Trade and Competitiveness Act

Allows NBS To Become NIST

The Commerce Department's National Bureau of Standards (NBS) officially became the National Institute of Standards and Technology (NIST) when President Reagan signed the Omnibus Trade And Competitiveness Act into law.

The name change emphasizes potentially far-reaching augmentation of the agency's mission. Under a section of the new law known as the "Technology Competitiveness Act," several new assignments designed to boost U.S. industry in the world marketplace are added to the traditional functions of NBS.

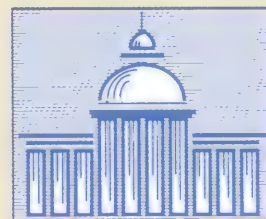
The new responsibilities build on the technical expertise of NBS, the only federal laboratory with a mission specifically to support U.S. industry. The law charges NBS (now NIST) to "assist industry in the development of technology and procedures needed to improve quality; to modernize manufacturing processes; to ensure product reliability, manufacturability, functionality and commercialization, especially by small- and medium-sized companies throughout the United States, of products based on new scientific discoveries."

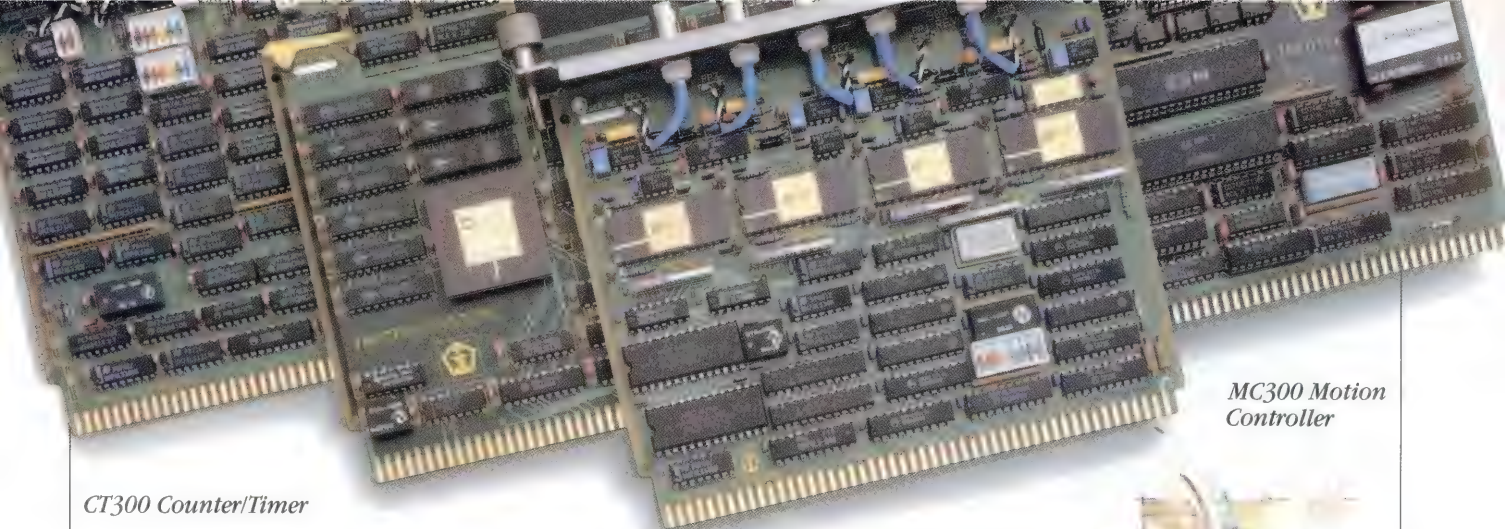
NIST will continue to serve as the nation's central laboratory for developing and disseminating measurement standards and scientific

data for science, engineering, manufacturing, commerce, industry and education.

The new assignments also draw on NBS' long experience in cooperative research ventures with private industry and universities. NIST is instructed to create a series of Regional Centers for the Transfer of Manufacturing Technology that will be affiliated with non-profit institutions or organizations; create a program to provide assistance and make federal technology available to state and local technology programs and technology extension services; establish an "Advanced Technology Program" to encourage the commercialization of new high-technology products; and support a Department of Commerce "Clearinghouse for State and Local Initiatives on Productivity, Technology and Innovation" to provide technical and analytical help to state and local officials making decisions on technology policy.

Under the new law, NIST has until December 21 to submit a new organization plan to Congress. At present, only the program for regional manufacturing technology centers has received funds. ■





CT300 Counter/Timer

*DSP316 Digital Signal
Processor*

DA300 D/A Converter

*MC300 Motion
Controller*



Imagine The New Possibilities In HP Data Acquisition And Control.

Now, four new data-acquisition, analysis and control products are available for your Hewlett-Packard 9000 200/300 computer—from Infotek, the world leader in HP enhancements.

The new, economical Infotek DA300 digital-to-analog converter features four independent channels with 16-bit precision. Modes of operation include direct voltage output or waveform generation, supported by a 64K buffer. It's a first for

HP 9000 users.

Another first, the CT300, is the industry's only board-level four-channel Counter/Timer for HP Series 200/300 computers. Each channel operates independently with 16- or 32-bit accuracy. Input rates up to 20 MHz can be achieved in counter mode.

For signal processing applications such as FFTs and digital filtering, Infotek introduces the DSP316. Based on a fixed-point DSP and 16-bit data memory, this single-slot coproc-

essor operates at up to eight million instructions per second.

And now Infotek also makes available a programmable motion controller, the MC300, for control of d.c., d.c. brushless and stepper motors.

With the popular family of A/D converters, Infotek offers the most complete

line of data-acquisition and control products for HP users. Imagine the new possibilities, then call or write today to Infotek Systems, 1045 S. East Street, Anaheim, California 92805-8508, (714) 956-9300, (800) 227-0218, in California (800) 523-1682, TELEX 678870, FAX: (714) 491-8644.



**INFOTEK
SYSTEMS**

NEW PRODUCTS

IDSC Announces marketretrievePLUS

IDSC Rental Company Inc., (Manchester, NH) has announced marketretrievePLUS a sales lead tracking and market analysis software package. marketretrievePLUS allows access to data by company, contacts, phone number, parent company and more. Market analysis reports, sales forecasts, sales management reports, form and custom letters are all possible. Operable on the Digital VAX and HP 3000, marketretrievePLUS is designed to share data with other systems like order entry and accounting.

Price is determined on a per user basis, depending on modules purchased. Contact IDSC Rental Company Inc., 350 Harvey Road, Manchester, NH 03103; (603) 645-6677.

Circle 376 on reader card

EMC Ships Memory For Spectrum Series

EMC Corporation recently announced that it is shipping memory for Hewlett-Packard's Precision Architecture Spectrum Series systems. The memory, named HXP-95X-16MB, is available in a 16-MB board and is priced at \$32,000. Step pricing is available for volume purchases.

The product is compatible with the high-end models of the Spectrum Series, which include the HP 950 and 955. The 16-MB board also is compatible with HP's 850 and 855 UNIX machines. Completely transparent to HP diagnostics, the board was designed with status indicator LEDs and an on-line/off-line switch to eliminate finger-pointing and make diagnostics more efficient. EMC currently is developing memory products for HP's Spectrum Series 925, 925LX and 935, to be released at a later date.

All EMC memory products are backed by a no-cost lifetime warranty, which

guarantees 24-hour replacement of any board the customer feels is not working properly. EMC products are serviced by EMC's worldwide Direct Response Centers, which provide local on-site service and stock a full array of spares.

In addition to memory products for Hewlett-Packard's Spectrum Series systems, EMC manufactures memory products for HP 3000 Series 68-70; Series 39-58; and Series 37, 37XE and Micro 3000XE. EMC also manufactures high-speed Falcon disc subsystems, which increase I/O throughput and overall system performance. Contact EMC Corporation, Hopkinton, Mass. 01748-9103; (800) 222-EMC2 or (508) 435-1000.

Circle 381 on reader card

HI-COMP Releases V5.20 Of HIBACK/3000

HI-COMP[®] has released version 5.20 of its database and file backup utility, HIBACK/3000, which now includes database and file backup across LAN/DS networks.

This backup facility offers HP 3000 users with one or more systems flexibility, reliability, speed and control in implementing a backup strategy, especially if connected via a LAN network.

The network backup facility of HIBACK/3000 supports all standard features including unattended operation in an operatorless environment, shared access during database backup, extended error recovery and store volume validation, high-speed execution by means of MPE disc caching, use of indirect files for including and excluding filesets keeping existing files during RESTORE, STORE only if database/filesets have been modified since a specified date, and an option for restoring across accounts and groups.

Contact HI-COMP America, (212) 556-6684, or HI-COMP GmbH Eichenlohweg 24, 2000 Hamburg 60, Vereins- und

Westbank BLZ 20030000, Kto.-Nr2/58244 Deutsche Bank AG, BLZ 20070000, Kto.-Nr.7313 935; 0049-04-6304011.

Circle 377 on reader card

DATAMAX Announces Release Of UNIQUE VI

DATAMAX (Santa Barbara, CA) announces the releases of UNIQUE VI — an integrated UNIX/XENIX business application for management and accounting — powered by the UNIFY RDBMS. UNIQUE VI is written in "C" and offers its own Range-Sort-Inquiry (RSI) Management Report feature.

UNIQUE VI has been coupled with the UNIFY RDBMS. UNIFY features RPT report generation, security tiering and powerful record indexing within a "friendly," menu-driven environment. The UNIQUE VI General Ledger has the capacity for \$99 billion year-to-date account totals while allowing for the account processing of \$9,999 separate companies, each with its own Chart of Accounts. UNIQUE VI provides multi-user capabilities on all versions of the 286-386-680xx computer families running UNIX/XENIX.

Contact DATAMAX, 3055 Paseo Tranquillo, Santa Barbara, CA 93105; (805) 682-3442.

Circle 373 on reader card

20/20 Available On HP 9000/800 Series

Access Technology Inc. recently announced the availability of its 20/20 integrated spreadsheet software package on Hewlett-Packard's UNIX-based 9000/800 minicomputer line.

20/20 Release 2.2, has state-of-the-art spreadsheet graphics, data management and consolidation facilities. 20/20 Release 2.2 also has an English-word command-menu user interface, ability to translate Lotus 1-2-3 files and 60 other functions.

Included among 20/20 Release 2.2's attributes are a macro facility, a print report facility, a spreadsheet size of 1000 X 8192, a global rounding capability to control calculation precision, an iterative recalculation option to solve simultaneous equations and resolve circular references, model password protection, programmable function keys and PostScript output support.

Features specifically developed for Hewlett-Packard 9000/800 minicomputer users also have been designed for and implemented into 20/20 Release 2.2. These features include support of Hewlett-Packard's Starbase Graphics Manager, through which all of Hewlett-Packard's output devices (both terminal and hardcopy) will be supported.

20/20 is available for mini, mainframe, micro and workstation computers, including Hewlett-Packard, DEC, IBM, Wang, Data General, Prime, AT&T, Sun, Apollo, and other UNIX-based machines and PC-compatibles.

Contact Access Technology Inc., 6 Pleasant Street, So. Natick, MA 01760; (508) 655-9191.

Circle 380 on reader card

TEI Announces PERSPECTIVE For HP 9000

TEI has announced that PERSPECTIVE, a project management package, now is available for the HP 9000 Series 300 and 800 running under HP-UX.

The product is designed to plan, analyze and report on small or large complex projects. The critical path method is used to analyze projects. PERSPECTIVE includes on-line processing, Gantt and PERT charts, I-J or precedence notation, time scale network diagrams and resource levelling to help plan and analyze projects.

Reporting options include graphics output for laser or dot matrix printers and plotters. PERSPECTIVE includes 14 standard management reports, or users can develop their own reports with an integrated report writer. A new feature of PERSPECTIVE gives PowerHouse users the ability to utilize project data for reporting or for integration with other applications.

Other features include Multi Project option (99 projects with up to 297,000 activities); Micro-to-HP 3000 data exchange; forecasting for resource, cost and risk

analysis; work breakdown structure; and a cost module.

Contact Michael Sweeney, TEI Inc., E. 3151 29th Ave., Spokane, WA 99223; (509) 534-7225.

Circle 400 on reader card

HP Vectra QS/16 Joins PC Family

Hewlett-Packard recently announced the HP Vectra QS/16, equipped with an Intel 80386 microprocessor.

With the HP Vectra QS/16, the high-performance of the floor-mounted HP Vectra RS/16 now is available in a small desktop package. The HP Vectra QS/16 can run Microsoft Operating System/2, Microsoft Windows/386 and the Santa Cruz Operations' Xenix operating system, as well as MS-DOS applications.

The HP Vectra QS/16 PC is designed for business and low-end computer-aided design (CAD) and computer-aided engineering (CAE) applications.

The HP Vectra QS/16 is for users who want a high-performance PC with a small footprint and do not need the added expandability of a floor-standing HP Vectra RS/16 PC. Equipped with a 40-MB hard-disc drive, the new desktop system is priced \$900 less than an HP Vectra RS/16 with the same configuration.

The HP Vectra QS/16 is available in four models ranging from 1 MB of user memory and a 1.2-MB 5¼-inch flexible-disc drive to a 40-MB hard-disc drive and an HP video graphics adapter. The hard-disc drives use disc caching for higher performance.

The use of surface-mount technology gives the HP Vectra QS/16 PC added reliability. Its 32-bit memory can be expanded



The HP Vectra QS/16 is designed for business and low-end computer-aided design (CAD) and computer-aided engineering (CAE) applications.

from 1 MB to 16 MB directly on the processor board, freeing all seven expansion slots for system accessories and enhancements. Like other HP Vectra PCs, the HP Vectra QS/16 PC includes terminal-emulation software that allows it to communicate with HP business computers.

A base model with a 5¼-inch, 1.2-MB flexible-disc drive is \$3,995. With an added 40-MB hard-disc drive, the HP Vectra QS/16 is \$5,095. The 40-MB version also comes bundled with an HP Video graphics adapter and a choice of 5¼-inch, 1.2-MB or 3½-inch, 1.44-MB flexible-disc drive for \$5,495.

Contact the Hewlett-Packard sales office listed in the white pages of the telephone directory.

Circle 379 on reader card

DataExpress Enhancements And Additions Announced

IMACS Systems Corporation has made several major announcements expanding its DataExpress series of information center products.

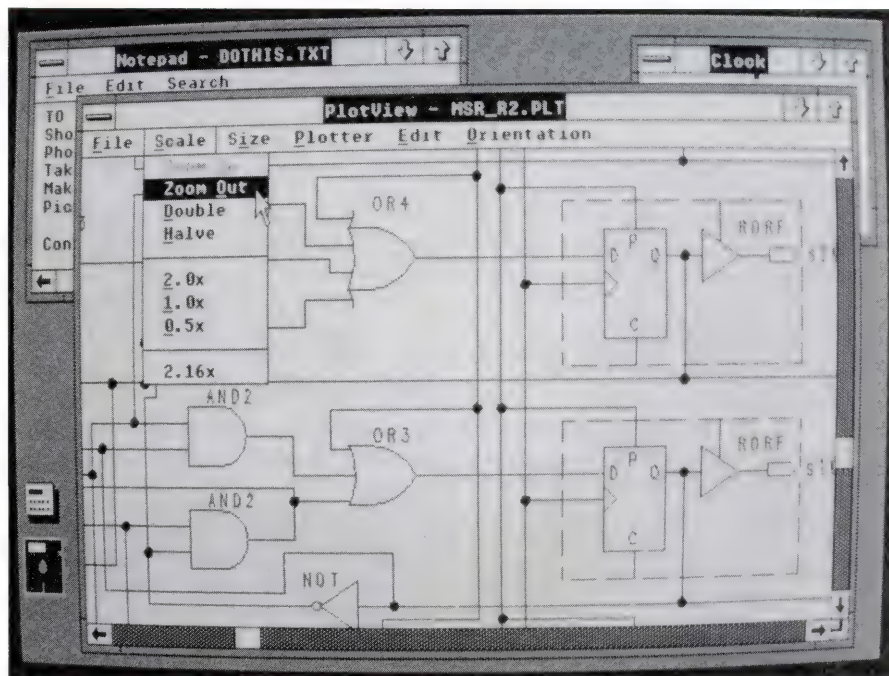
ReportDesigner II is a user report generator. An interactive design interface captures report specifications and layouts. Users can create sophisticated reports using ReportDesigner II's function key and PC-like screen features. This new level of the reporting module includes multiline and multi-image layouts, breakpoint editing, form formatting and mailing label generation.

GraphicDesigner provides the DataExpress user with an alternative method of displaying extracted data graphically. The DataExpress user interface provides a method for the selection of line graphs, bar charts and pie charts in two or three dimensions, color or monochrome and either horizontal or vertical layouts. This graphics module supports graphic terminals, many HP plotters and printers (LaserJet, ThinkJet, etc.) and PCs running HP graphic terminal emulation. Contact IMACS Systems Corporation, 2825 Eastlake Avenue E., Suite 107, Seattle, WA 98102; (206) 322-7700.

Circle 399 on reader card

New Plotter Viewing Program From Ajida

Ajida Technologies Inc. (Santa Rosa, CA) recently announced the introduction of PLOTVIEW, a utility program for viewing and editing Hewlett-Packard Graphic Language (HP-GL) format plot files. PLOTVIEW runs under the Microsoft Windows operating environment so users can



PLOTVIEW is a utility program for viewing and editing Hewlett-Packard Graphic Language format plot files.

view HP-GL plot files while running other applications (word processing, spreadsheet) by opening another window. The user then may select to view and/or edit the plot file. This allows users to create graphics in a drawing, paint or CAD/CAM program; examine/edit the graphics with PLOTVIEW; and then paste the graphics into a document or report.

PLOTVIEW features include scaling, pan, paper size selection for printing, rotation, zoom in/out, cut/paste and printer/plotter selection.

With PLOTVIEW, the user may select, clip and paste any section of the plot file into another document or drawing. Printing plot files also is made easier with PLOTVIEW. Instead of having to wait for the plot file to print on a high quality but slow plotter, you can convert the plot file to print on any standard output device supported by Microsoft Windows. This allows you to get a check of the plot file before you print the final copy on a plotter.

PLOTVIEW (\$59) includes a program disc (5¼-inch or 3½-inch) and instruction manual. In addition, PLOTVIEW comes with a 30-day money back guarantee. Contact Ajida Technologies Inc., 613 Fourth Street, Santa Rosa, CA 95404; (707) 545-7777.

Circle 398 on reader card

SAS Institute Inc. Releases SAS/ASSIST

Providing a menu-driven interface to many of the basic SAS System tools, SAS/ASSIST software now is available free to users of the SAS System for personal computers.

SAS/ASSIST gives users access to basic tools for data analysis, report writing, graphics and more. The software is a task-oriented system designed to allow users to accomplish basic SAS System tasks with minimal effort. The software comes packaged with sample SAS data sets and an on-line tutorial. Help also is available throughout the system.

The first release of SAS/ASSIST software is not designed as a front-end to all the capabilities of the SAS System. However, some of the most widely used features are accessible, such as reading data from a flat file into a SAS data set, producing tabular reports from data stored in SAS data sets, creating presentation and information graphs, generating descriptive statistics and statistical reports and saving SAS programs for execution in another session.

In addition to these basic SAS System tasks, a desktop tools section provides a calculator, phone directory and access to

Continued on page 82.

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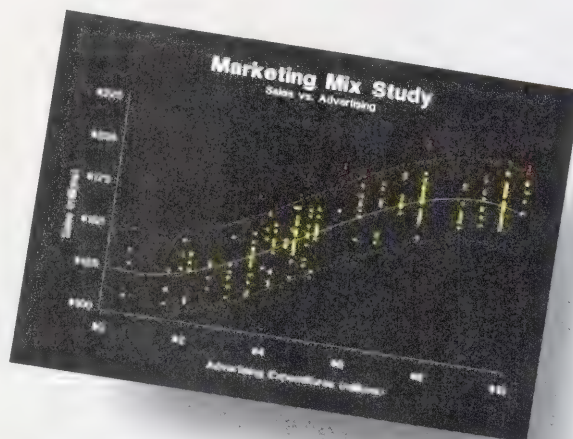
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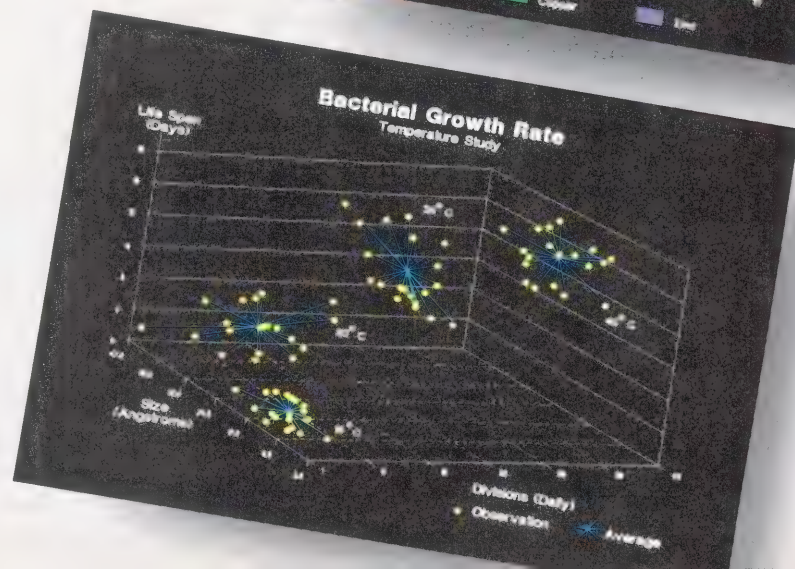
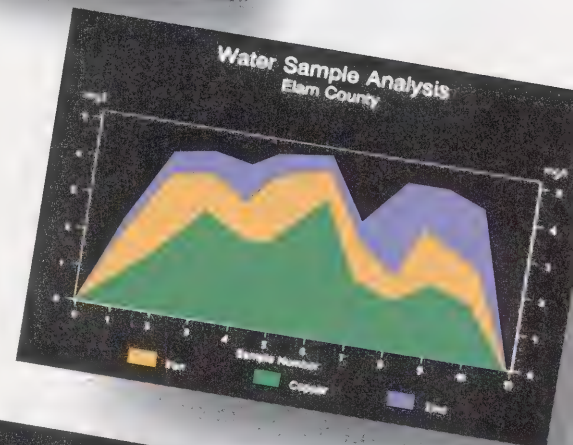
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The SAS System runs on Hewlett-Packard's HP 9000/300 and 800 series under HP-UX; IBM Corp.'s 370/30xx/43xx and compatible mainframes under OS, CMS, and VSE; Digital Equipment Corp.'s VAX™ series minicomputers and workstations under VMS™; Prime Computer, Inc.'s Prime 50 series under PRIMOS®; Data General Corp.'s ECLIPSE® MV series under AOS/V5; and IBM Corp.'s PS/2, PC AT, and compatibles under MS-DOS® and PC DOS.

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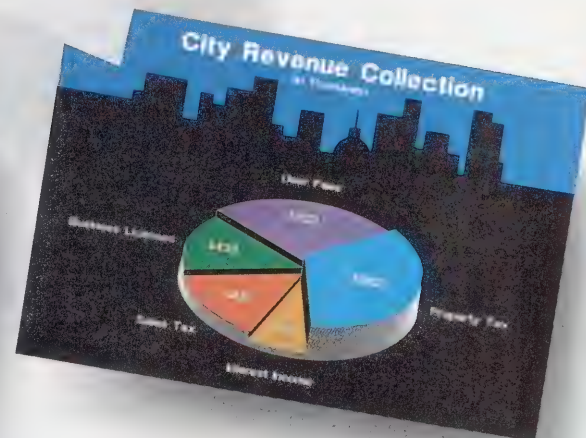


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A Graphic Pointing Device To Rival The Mouse

SketchPro

[By Don Person]

L

et's face it. Impressive pointing devices have become visible status symbols in the mouse-driven era we find ourselves in.

The ideas formulated by the XEROX PARC staff and propagated by the Apple Macintosh, particularly the idea of the desk rodent, thoroughly have permeated popular culture to the point where it's easy to be fooled into thinking the only way to go beyond the limitations of an alpha keyboard is the mouse. Nothing could be further from the truth.

Input pointing gadgets are as varied as our need to articulate graphic ideas on our computers. I've been exposed to the whole range of light pens, mice, trackballs, joysticks and the digitizing tablet. I especially was pleased to see the SketchPro arrive. Here was a chance to try another version of my most favored style of graphic input gizmo. In performance terms, there's a lot to like.

The SketchPro gives you the choice of a slide-around, four-button cursor/target/graticle or a stylus/pen like the one found on the older HP 9111. In HP parlance, the moveable graticle is a graphics cursor. Either one connects via a locking RJ/TM connector like the jack found on a modular telephone. Only one of the two can be connected at a time.

I think my AT systems spend more time with their covers ripped than they do fully dressed. I'm always plugging interfaces in or out, and I know I did it a lot

recently removing and re-installing the MS Bus Mouse. Getting the SketchPro ready requires a small screwdriver and a few minutes of time — and the machine cover stays on.

Installation

INSTALLING THE SKETCHPRO on a PC-compatible is a snap. You plug the tablet into a COM1 or COM2 serial port, power up the tablet, run the install program supplied on disc and reboot the system.

This would be four-star simple except for one major complication. There are 32 little dip switches on the back, and the explanations are anything but clear. After looking at the sample setting for common emulations, I'd swear the switches are interactive. For example, switch SW-1-1 is labeled as the 7-bit to 8-bit switch under HP MODE settings. If you go to the SummaGraphic emulation, it's labeled "Remote Control." In HITACHI mode, it becomes the English-Metric switch. No switch seems to do the same thing twice. It's inconsistent and confusing, to say the least, and nowhere is the rationale explained. A better instruction book came with my lawn mower.

The Microsoft Bus Mouse is our reference point from here on because the primary emulation provided by Sketchpro is the MS Mouse. I wasn't able to find any software that offers specific "native" support on how to interpret serial communication with the tablet. HP only supplies a PC driver.

SOME REQUIREMENTS PLAINLY FAVOR one type of input device over another. The light pen is nearly perfect for free-form entry of original art, provided you have a flat-faced monitor horizontally mounted.

Joysticks are as perfectly suited to video games as the tablet is to entering complex objects from hard copy. The differences between the mouse and the trackball can be much more elusive. While the trackball wins, more people already use the mouse.

You can't digitize a printed page with a mouse, at least not with any expectation of scaling accuracy. This is the area where the SketchPro can shine, unless you combine a standard mouse with the ScanJet or a similar full-page digitizer.

Consider this: you have a map, architectural drawing or

any other line-drawn art that can be reduced to the 11- × 11-inch working area of the tablet, and you want to get it on the screen for further manipulation. The only way to do this and maintain the proportions of the original is to trace the outlines and other pertinent details through the top film. SketchPro excels at this. I based my evaluation on the way it works with AutoSketch by AutoDesk Inc., (Sausalito, CA), makers of the top-end package, AutoCAD.

In my trials, I set out to digitize several objects — a small road map, an architectural drawing of an office floor plan and

a magazine line drawing with a lot of curved lines. Several surprises resulted.

First, I found a marked difference in accuracy between the graticle/cursor input and the stylus/pen. Pointing accuracy with the stylus is seriously "off." Not wanting to trust AutoSketch exclusively, I compared my results with the graphics mouse driver in True BASIC 2.01 with the same result. I moved the pen around, selected a dot on the Hercules mono or EGA color screen and clicked the point down.

The dot consistently jumped anywhere from three to 12 dots higher on the screen. No matter how vertical or how carefully I pressed, the "click" point never matched the graphics cursor location. If there's any kind of adjustment for it, I never found reference to it. The pen was very disappointing.

The cross-hair cursor was another story. This baby could connect to within plus or minus one dot every time, and I quickly switched to using the four-button graticle.

Beware of changing from the stylus to the cursor on the fly. Changing input devices with power on can produce unpredictable results. Usually it works, but about one time out of 10, it hangs up the tablet or the driver. Nowhere in the user book does it tell you not to change plugs with power on, but I don't suggest it.

Changing from the stylus to the graticle (cursor) is a struggle. It uses a recessed-locking, clear plastic plug in a low-visibility location. The lock tab is so far under the top lip of the tablet that you need a special tool to release it. Being clear plastic, it isn't easy to see which way is up. Of course, only one way is right, and Murphy's Law rules.

Even worse, to change, you have to stand the tablet up on its tapered end and hold it with one hand. Two more hands are needed to move the plug safely. It's a two-person job unless you want to risk a tumble to the floor or you're very good

You plug the tablet into a COM1 or COM2 serial port, power up the tablet, run the install program supplied on the disc and reboot the system.



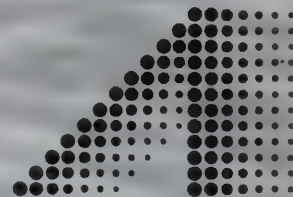
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CIRCLE 300 ON READER CARD

at vertically balancing a slim object on its thin edge. The serial port output (screwed on) and the power cord (plugged in) make this a fumbling, exasperating task.

Overall Responsiveness

I TRIED SWEEPING radials from a corner of the AutoSketch drawing window to its far corner. Since the line is redrawn for each interval in which a fresh paint is available, you'll see a pattern of radial lines whose distance is proportional to how frequently an update position is ready. SketchPro isn't as snappy as the MS Bus Mouse or the old HP-IB-connected HP 9111 that it replaces. So, how well does

SketchPro replace the 9111? Not at all, if you use an HP technical computer.

My next step was to borrow a serial version of the MS Bus Rat. The comparison is more favorable when comparing serial-to-serial with no subjective differences between them.

SketchPro wins hands down in digitizing complex objects. The digitized map needed touch-ups, but was much more accurate than the free-hand tries with the mouse. Even in the touch-up phase, the tablet was mightier than the mouse, although the two are a lot closer in that job.

The toughest test of the SketchPro turned out to be the architectural drawing. Line dither when aligning and digitizing long straight lines was particularly difficult.

No matter how much I twisted, slid and jockeyed the mechanical drawing, I couldn't get rid of line dither on opposing or right-angle edges. I even switched to graph paper. First, I marked a corner with the cursor cross-hairs, then carefully aligned the paper so that there was a horizontal line across the top with no "zig-zags." Then, with the paper fixed and the first clean line drawn, I repeatedly tried in vain to make a nine-inch square using the graph paper intersections for guidance in drawing a ditherless square. To make a clean line,

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CIRCLE 239 ON READER CARD

I always had to stray from the known square edges of the reference page. At 10 lpi, it was necessary to go a full tenth of an inch to make it "square" on the screen.

A close check of the specifications showed some interesting and creative wording. While there are specs for accuracy of .02 inches and .01 inches for repeatability, there's no linearity information given. I'm not even sure these are meaningful outside their use by the sales force. The included definition of accuracy in the appendix of the user-guide reads more like a tautology than an explanation. The book defines it as "freedom from error; how closely the digitized point matches the physical location of the pointing device on the tablet." Relative to *what*, or are we *absolute* here?

The "soft key" areas marked on the tablet are a waste of time and space on the current model; there's no software support for them. This useless addition is made worse by the fact that you aren't told how or when you might use this feature. We're only told that these keys will do something if our software can support them. Instructions on activating the keys tell us to move some dip switches to turn them on. But it never says whether you're supposed to move them from "off" to "on," or the reverse. It's lucky for all of us that the tablet is better than the book because with help like this, we might never get it right.

More Documentation Woes

ONE OF MY BIGGEST complaints concerns the user's manual. It provides no concrete information, which heavily impacts my view of support for the product. No indication is given about the producing division or how to make contact at the corporate level. Other companies at least have an address for correspondence and a phone number.

After a close examination of every supplied scrap of product information, from the packing box to the loose paper inside, not a shred of divisional contact information was found, unless, of course, you wish to call Singapore as listed on the printing credits or plead for a number in San Diego. The little book does say you must speak with a local dealer should you have questions. You and I and the three dealers I "cold called" know better. HP hasn't really told the dealer network

anything more substantial than the wee bit we can read for ourselves.

There's a lot that I'd like to know about SketchPro that isn't included in the manual. For example, where do I get a technical or programming manual?

No provision for computers other than the PC seems to have been considered. This is evident when you see that the supplied driver is only suitable for use with a PC system. The fact that the tablet does various emulations is of no use, because none of them is explained.

The command/instruction set outlining the device's serial stream language was left out. This

was explained in detail for the HP 9111, but I sorely missed it when I read through the SketchPro flier. What if I'd like to use it with a mini? How do I go about interfacing it?

For a peripheral bearing such a significant price tag, the manual is an embarrassment. It's as bad as the installation program is good. Customers shouldn't have to jump through a hoop to learn more.

User information is so oversimplified that it can give a misleading impression. We're told that no digitizing is done unless the stylus is clicked or the button on the cursor is pressed. So, then, how is the device constantly sending position information if it isn't digitizing?

Whoever wrote these explanations wrote this from the standpoint of somebody using a CAD program without the benefit of any depth of understanding. The pad continuously digitizes. When you "click" it, a command is sent to the mouse driver telling when a click starts, is released or is being "dragged" across the page.

Nonetheless, I have to admit, the SketchPro is a great package, provided you have the kind of job that it does best. It's a fantastic graphic input device for tracings, good for free-hand work and as good as the Microsoft Serial mouse for pointing within a word processor or a spreadsheet or database program. For these last two, \$695 is a bit of over kill.

The installation procedure (with the exception of the kludgy row upon row of dip switches) is top notch, and in practice, it's as completely intuitive a peripheral as I've ever used. It is flawed somewhat by an excessively simple (and hence, incomplete) user manual and by the company's failure to disseminate detailed information in a meaningful or complete fashion. It's still one fine piece of equipment. — *Don Person is an independent consultant based in Albany, NY.*

It's lucky for all of us
that the tablet is better
than the book because with
help like this, we might
never get it right.

Bringing Graphics To The Factory Floor

▲
A Look At One Of HP's Industrial Precision Tools
▼

At the end of 1988, Hewlett-Packard will introduce HP Interactive Visual Interface, a user interface development tool that will do for programmers and systems integrators working with factory automation applications what the HP NewWave environment can do for developers of office automation applications.

Both products offer a graphical user interface with objects to manipulate in place of commands to execute.

The similarities between HP Interactive Visual Interface (IVI) and NewWave extend to the internal designs. Both HP IVI and HP NewWave are based on standards. Microsoft Windows 2.0 is the basis for HP NewWave, and the environment eventually will support OS/2 and Presentation Manager. HP IVI is based on the X Windows System, Version 11, the windowing standard for most major computer vendors, and HP-UX, an industry-standard UNIX environment.

By basing both products on industry standards, Hewlett-Packard has positioned them to take advantage of technological advances. For example, HP IVI will be able to support 3-D graphics when extensions to the X Windows System provide for this new capability.

BOTH HP NEWWAVE AND HP IVI contain a module called the Application Program Interface (API). In both cases the API is a **[By Peggy King]**

command interface to application programs, which provides a consistent way to manipulate objects on the screen.

In NewWave, the API provides the foundations for Help and Computer-Based Training (CBT) scripts that will run on top of an application.

In HP IVI, the API accesses the various features including standard graphic objects (circles, rectangles, arcs), dynamic attributes (area fill, color changes, scaling, rotations) and widgets from the X toolkit (checkboxes, scrollbars, pop-up menus). Widgets are defined as graphical representations of screen design utilities from the X toolkit. They are used as part of an interactive dialog.

ONE MAJOR DIFFERENCE between the products is that HP NewWave is an application integration environment whereas HP IVI provides developers with a tool for creating a user interface for industrial applications. NewWave is an object-oriented environment with a standard library of symbols (icons) that are a visual link between office tasks (applications). With HP IVI, the developer can create a standard symbol library for an industrial application and attach dynamic qualities to each symbol.

The tasks that office workers perform in any office environment are similar enough to allow the use of familiar office objects such as file drawers, waste-baskets and mail trays, as icons.



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[DESIGNING GRAPHIC DISPLAYS — A CREATIVE PROCESS]

The 1980s could go down in history as the decade we fell in love with graphics. In the industrial process control environment, the relative friendliness of a system is influenced by the ease of interaction with the graphic displays.

Industrial process control systems monitor and control various manufacturing facilities. The graphic displays serve as the operators window to the process and to the hardware located on the plant floor. From these displays the plant operator must monitor current process status and react according to the dictates of the information presented. Whether we are monitoring a boiler, reactor, fermentor or weigh scales, the concepts are the same. The clarity of the information in the operator's eye is critical not only in determining speed of response, but also is a major contributing factor in initiating a correct response. The control program strategy may be well designed, but if the graphic displays that support these programs are ineffective, then the overall ability to operate the plant is degraded.

Clarity comes from recognition — which is the ability to visualize. There must be a recognizable physical analogy on the graphic display to the actual hardware out on the plant floor. Most of us recognize a suggestion of an identifiable form easier than an accurate prototypical rendering. For example, when we think of a heart, the familiar Valentines Day form, rather than the actual biological shape, comes to mind. When creating graphic elements, the same recognition techniques should be used. Plant operators recognize the shape of a vessel; extraneous detail detracts from the clarity of the simple form.

The arrangement of these graphic elements must provide a natural visual roadmap. Fluids should be depicted moving from top to bottom, or from left to right. Cognitive reasoning makes these directions more natural (liquids flow down due to gravity, and we read left to right). These are patterns that meet our expectations. Good design should take into account that we expect things to work and appear a certain way.

Another expectation a plant operator has is some form of feedback. If he issues the appropriate command to start a pump, he should be given feedback confirming his expectation that the pump has, in fact, started. For every action there should be an equal and opposite reaction.

The most common graphic technique used to provide this feedback is the use of a color change. The concept of representing idle and active states of devices through color is more effective than using text such as OFF and ON. A universal color scheme should be used to provide consistency on all graphic displays. Valves, agitators, conveyors, pumps etc., should use the same two colors to represent idle and active states. My personal choice is red for idle states (closed, off, stop) and green for active states (open, on, start). You easily can associate these colors with device states because they are analogous to the common traffic light where green means go (active) and red means stop (idle). This analogy is more

meaningful, for example, than the colors yellow and blue, which have no intuitively recognizable meaning.

There is a very common tendency to overuse color. Having the ability to create graphics in 12 colors seems to invite the use of all 12 on each display. Judicious use of color creates a cleaner looking graphic and you won't have multicolored elements competing for the operator's attention. Color also should carry a single purpose identity. For example, liquid levels in tanks represented by dynamic bar graphs will be recognized more easily if they are the same color than if you try to distinguish different liquids with different colors. The dual function of attempting to show level and product tends to be distracting.

One final comment on the use of color is that a surprisingly large segment of the male population is color blind. Before designing graphic displays, I generally check with the local plant to see if they screen their operators to avoid this problem.

When I instruct engineers in the creative process of designing graphic displays, I ask them to look at the plant through the eyes of an operator. Details provide the visual clues necessary to reach the correct and logical conclusion when interpreting plant status from the graphic display. I ask them to find out what is meaningful to their plant operators. Do they refer to a particular valve by its equipment tag number (FV-101) or by its engineering descriptor (TK101 LOW FLOW BYPASS) or just as "that valve under the reactor." This determines what type of information should be displayed on the graphic. I have seen graphic displays cluttered with equipment tag destinations, which were important to the engineer who designed the graphic, but were meaningless to the operator forced to use this graphic on a day-to-day basis.

The final concept I stress is "less is more." The graphic display should be loaded with messages and information that normally are invisible to the operator. This information is dynamic in nature. It normally appears in the default background color (usually black on black) and only when it's appropriate to be displayed will change color and become visible to the operator. The use of static text and graphic elements therefore should be avoided. For example, it would not be meaningful to display a fermentation timer valve if the fermentor has not been inoculated and biological growth is not in progress.

The graphic displays should be linked logically in a manner so that an operator can zoom in on more detailed plant area graphics. From these detailed area graphics he is able to move through the various sections of the plant with a minimum number of keystrokes and be provided with auxiliary "help" graphics to refer to when problems arise.

Well designed, aesthetically pleasing graphics improve the overall operation of the plant by providing a safer more productive facility. They also generate a wealth of analytical information for the product optimization necessary in today's competitive environment. —*John Johansen is a systems engineer working in process instrumentation at Computer Associates, Tenafly, N.J.*

Therefore, the NewWave environment can use these standard graphical symbols as metaphors for tasks that are performed in almost any kind of office, and applications can be linked to these objects.

Factory floor environments are too diverse to allow a single set of icons to work as a standard across industries. Each industry has different processes and even very similar products may require very different production processes. No universal symbols can be used to represent "standard" factory configurations. Because each computer-integrated manufacturing (CIM) implementation is unique and requires customized displays, it is important for developers to be able to design screens quickly and to modify them easily.

HP IVI provides developers and systems integrators with three major screen design advantages: the convenience of using one product to merge text and graphics in screens and displays, an interactive editor to use instead of coding for designing screens and forms and the ability to create symbol libraries as part of a consistent user interface.

One advantage of the X Window System in the CIM environment is the way that multiple windows eliminate the need for multiple terminals. Using the X Windows System, the user can have simultaneous access to multiple applications by selecting menu options to place additional windows on the screen. Because IVI integrates text and graphics, any window can contain a combination of words, panels and symbols.

Communicating Symbolically

AN ADVANTAGE OF HP IVI is that a developer using an interactive editor to create and modify display screens may take only one hour for a task that might have taken 20 hours or more when coding was involved. According to Human Interface project manager Dushyant Sukhija, using HP IVI to develop display screens in factory automation and CIM environments is "expected to yield a 50-70 percent productivity improvement in user-interface application development."

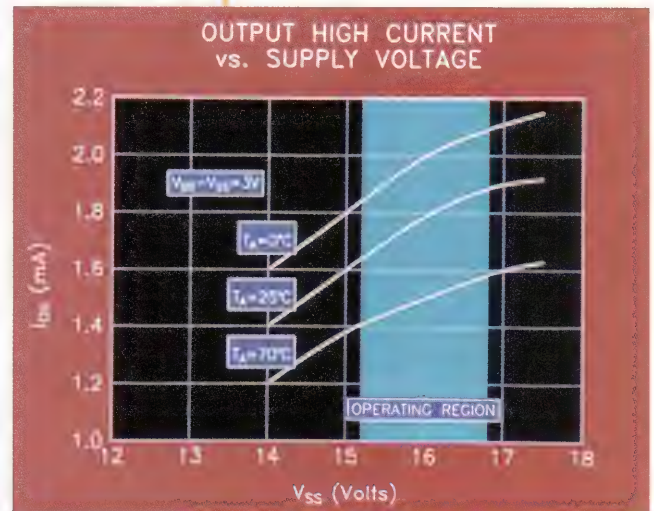
A developer can create and reuse sets of symbols that have dynamic attributes like color change, scaling, area fill and rotation. Because HP IVI is intended for use on the factory floor rather than in the office, dynamic displays are an integral part of the user interface. In office environments, users may enjoy seeing an hourglass sift animated pixels of sand while their application is being loaded, but the animation is not an essential feature in helping office workers perform their duties.

In industrial sites, animated symbols, which transcend language barriers and the need for industrial workers to stop running a production line and read data carefully, can convey essential information about processes. This animation of pertinent information can be a tremendous asset in our current global environment where workers often speak one language

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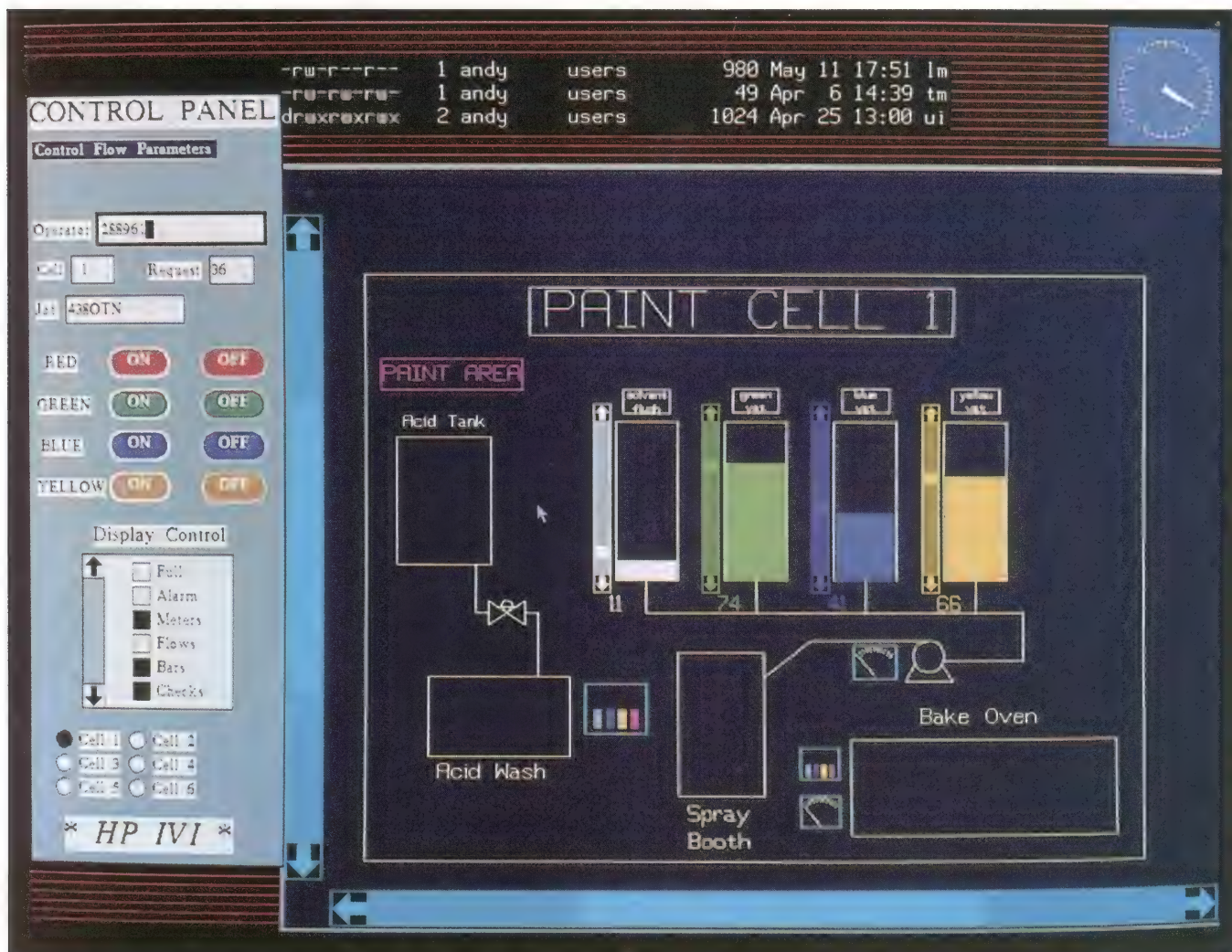
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HP's Interactive Visual Interface creates symbols that convey essential information about processes in operation on the factory floor.

while products are designed by engineers who speak another.

In Hewlett-Packard's survey of industrial automation customers, these customers identified the need to present complex information in many different simple formats so that workers can interpret changes easily to process information and take the appropriate actions. Animation of symbols can help solve this problem. Dynamic area fill can be used to display real-time changes in the level of liquid in a tank. A color change from blue to red can indicate an alarm. Scaled symbols that become large incrementally when a process goes out of bounds can replace figures on a monitor as a way to represent process parameters.

Developers can use HP IVI to create and reuse animated process displays when they design multiwindow process control screens for automated factories and can modify these screens quickly when requirements change.

Because major vendors support the X Windows System on their display hardware, the screens and forms created with

HP IVI are compatible with terminals that range from small monochrome displays to 32-bit, high-resolution color graphics terminals. According to product manager Sukhija, the X Window System "fits naturally into the multivendor, technical computing environment that so many plant automation customers require. The X Windows System allows computers from different vendors to utilize applications without any change to the application, a capability that never existed commercially before the X Windows System."

As the first industrial automation software product to be written on top of the X Windows System and UNIX, HP IVI provides new graphics capabilities for distributed computing environments and enhanced productivity for user interface designers racing to meet the changing requirements of automated factories.

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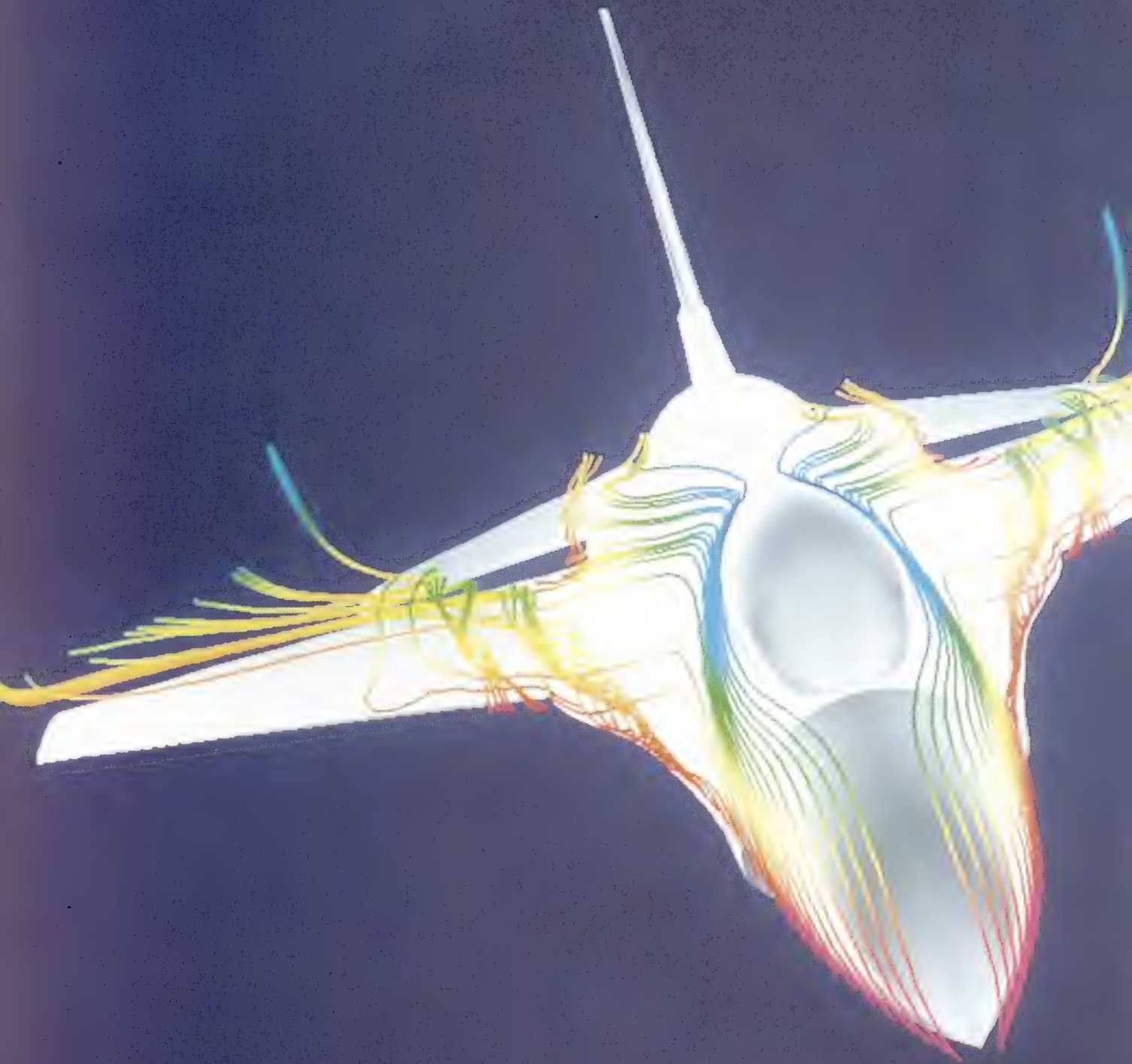
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This photo, courtesy of Sterling Software and NASA/Ames Research, shows the simulated flow field around the F-16 A.

A Look At Potential Applications,
Design Philosophy And System Features



HP's New Graphics Animation Superworkstation

[BY ANDY BARLOW]

At Siggraph this year, HP introduced the Model 835 TurboSRX Animation Superworkstation. This workstation allows image playback at rates never before achieved on a general purpose system. Using the Model 835 Graphics Animation Superworkstation to generate and animate images interactively in final rendered form, a productivity gain of more than ten fold has been achieved over more traditional approaches.

The system is composed of the 825/835 TurboSRX and a high-speed animation interface, which replaces the regular graphics interface. This interface transfers images from main memory to the TurboSRX frame buffer at up to 13 MB/sec. The animation interface also provides all the capabilities of the regular graphics interface.

THE ANIMATION INTERFACE will benefit many applications. The broadcast and entertainment fields have used animation for a long time. However, recently it has become an integral part of scientific computing. Applications such as weather forecasting, military simulation, finite element modeling, molecular modeling and industrial design are finding that motion or animation provides a much



The sequencing capabilities of the graphics animation superworkstation are displayed in this deployment of landing gear.



Wavefront Technologies' software was used to simulate this space shuttle docking. The positions can be changed to show motion.

more realistic representation of the object in the real world.

Until recently the amount of computation needed to model and generate a sequence of images has been limited to those engineers and programmers who have access to large mainframes. The graphics animation superworkstation offers an affordable way to achieve more computational power without buying a mainframe.

The image data that make up the image sequences can be data that occur naturally such as satellite cloud motion, or can be computer-generated or computer-enhanced data. The ability to loop these images allows users to detect subtle changes from one image to the next. If the same images are viewed one at a time, the changes often go unnoticed.

In weather forecasting, for example, images from satellites, such as those taken over a period of time, are stored in the 835 TurboSRX. These images then are replayed to better understand weather patterns and to make better forecasts.

Understanding fluid flow is also very important. Sterling Software currently is working with NASA's Ames Research Center on a program called Graphical Animation Software (GAS). GAS is a program, which runs on the 825/835 TurboSRX, that was developed to support the computation fluid dynamics work at NASA. The program allows users to visualize the data results of a flow analysis. Gas particles, for instance, as they pass over aerodynamic structures such as airplane wings can be visualized. Or, the user may wish to visualize pressure changes in a turbine. The calculations to

understand these visualizations are computationally intensive. However, using the animation superworkstation the images can be precomputed and replayed back.

Perhaps a more traditional application is in the broadcast industry. Wavefront Technologies, a leader in the animation market, also recently has completed a port to the HP 9000 family of computers. The Wavefront graphics imaging software provides users with sophisticated modeling, animation and rendering capabilities and allows users to use various other sources of external data to create three-dimensional dynamic imagery. These capabilities now are available for many other types of applications such as CAD/CAM, or to understand real-time motion (pitch, yaw and roll), or to model theoretical models of light and movement.

The automotive industry uses Wavefront to test car design concepts before they are built. Several ray-traced images can be sequenced to add motion to the scene.

Various Approaches To Animation

SEVERAL APPROACHES TO animation are used by various vendors. The first approach is to prepare images, store the images on high-speed parallel discs and then display the images rapidly. The advantage of this approach is that it allows for relatively long sequences to be animated. The disadvantage is that very expensive disc and power resources are

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required. Also, the image loop is fixed and interactivity with the data is limited. In addition, multiple mechanical discs are not as reliable as other alternatives and interactivity with the loop is limited by the requirement to rebuild the animation sequence completely and restore it on the disc before it can be observed.

A second approach is to use dedicated display memory. This is implemented by a number of different graphics terminal manufacturers. In this case the memory is electronic and usually is dedicated for use as the frame buffer. With this approach short loops can be displayed very quickly. The downside to this approach is that there is no interactivity. The frames are precomputed and displayed in the exact sequence in which they were generated. In addition, special purpose memory is required and graphics-terminal host systems tend to be fairly expensive.

The third approach is the approach HP has chosen. This approach to animation stores the frames in the main memory of the system and passes the images to the display memory of the graphics processor. This approach requires a very high-

Sterling Software
1120 San Antonio Rd.
Palo Alto, CA 94303
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Wavefront Technologies
530 E. Montecito St.
Suite 106
Santa Barbara, CA 93103
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Model 835 TurboSRX Graphics Animation Superworkstation

Hewlett-Packard
3000 Hanover Street
Palo Alto, CA 94304

System Specifications:
Price: Starts at \$67,000
HP Precision Architecture
Word Size: 32 bit
Virtual Memory Address Space: 48 bits
Physical Address Space: 512 MB
Cache Memory: 128 KB
Instruction Cycle Time: 66.7 nsecs.
Floating Point Performance: 2 MFLOPS
Memory: 8-96 MB ECC RAM
I/O Slots: 7
Color Monitor Resolution: 1280 × 1024
Frame Buffer Size: 2048 × 1024/plane
Standard Planes: 8
Optional Planes: 24
Overlay Planes: 4
Z-Buffer: Hardware, 16-bit full
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FIGURE

Data Description	# Frames/sec -835
1kx1kx8 bits	13.1
512x512x8 bits	52.4
1kx1kx24 bits	4.4
512x512x24 bits	16.4

Examples of data speeds for HP's new Graphics Animation Superworkstation.

speed interface between main memory and the graphics processor.

The advantage to this approach is that the frames are stored in memory. This gives the user interactivity. The user for instance can change the frame display rates, do some processing, change the start and end points, stop on a given frame or reverse the loop. Some applications are best observed using very slow rates. Other sequences need higher rates to best perceive continuous motion. Applications such as fluid dynamics have to be controlled continuously to best understand the data. The ability to interactively match the animation rate to the particular image sequence makes the system more productive.

Most animation applications also require the ability to pan and zoom the image while animating. The HP approach permits this. Meteorologists often want to zoom in on a particular cloud formation to compare a developing storm with historical patterns that are on a mass storage media.

Finally this approach can be used with a general purpose workstation. A system that is dedicated to do animation may only be accessible to a specialist. If everybody in a department needs animation in addition to a workstation, then this must be a consideration.

Features Of The Graphics Animation Superworkstation

THE LIMIT TO THE number of images that can animated is the amount of memory that is available in the system. Using the 825/835 up to 96 MB of RAM can be added as needed. As more memory is added, longer sequences are possible. The heart of the graphics animation workstation is a set of two boards. This set is a full superset of the current product. The board set does not affect the performance of either the Series 800 or the TurboSRX, so all applications currently that run on the 825/835 TurboSRX can use the new interface set. The board set provides direct DMA to main memory at 12 MB/sec for the 825 and 13 MB/sec for 835. The transfer



Photo courtesy of Sterling Software and NASA's Ames Research Center.

A simulation of the intense pressure and heat inside a jet engine is shown in this cross-section "hot streak" analysis of flow around a turbine blade.

rate on the existing set is 1.9 MB/sec on the 825 and 2.1 MB/sec on the 835.

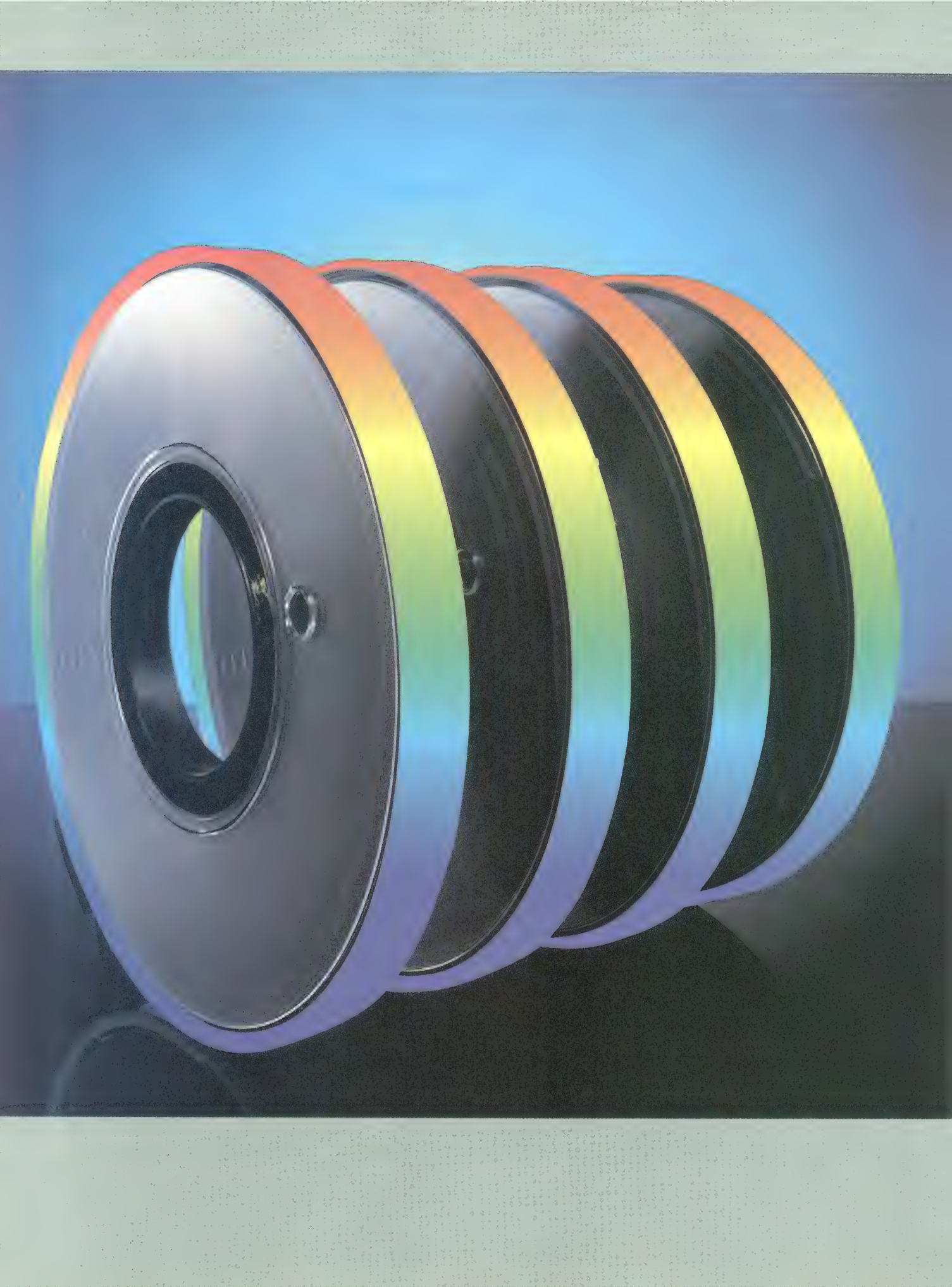
The display speed in terms of frames per second depends on the display speed and the color depth of the data. Examples of the data transfer speed are shown in *Figure 1*.

Support for the graphics animation interface is provided on HP-UX through Starbase. The graphics animation interface also is supported on the X Windows System. The price for the graphics animation superworkstation begins at \$67,000; as more memory is added the price will increase.

This product opens up a whole new world for Hewlett-Packard. With the addition of software suppliers such as

Wavefront Technologies and Sterling Software the animation superworkstation becomes one the most competitive animation workstations in its class. The product allows image play back at rates never before achieved on any existing general purpose graphics workstation. This product will provide HP huge opportunities and a whole new set of competitors.— *Andy Barlow is a graphics product marketing engineer at Hewlett-Packard, Ft. Collins, CO.*

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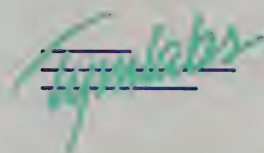
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PC GRAPHICS:

Buying What You Need

Paint Programs Versus Business Graphics Packages

As business people take increasing advantage of desktop publishing, they are beginning to realize the importance of incorporating high-quality graphics to produce persuasive business presentations and reports.

For the MS-DOS-compatible PC user, selecting a graphics package from the variety available can be confusing.

Although the quality and scope of graphics programs vary, some features available in the best programs include:

- flexibility in customizing and editing images
- extensive quantity and quality of picture libraries
- bold, high-quality graphics suitable for formal reports and presentations
- merged text and graphics
- direct integration with Lotus 1-2-3 worksheets
- integration with word processing and office solution packages

Graphics programs generally fall into two major categories: low-priced, medium-quality output painting programs and more expensive, higher-quality business graphics packages. The most suitable graphics package for you depends on your needs.

A painting program can supply your basic business graphics needs. These types of graphics applications can create departmental graphs showing growth, output and future requirements suitable for your immediate supervisor's review.

[BY MARIE BERNARD]

They also are capable of creating an in-house newsletter.

On the other hand, if your departmental projections will be reviewed by the general manager, or if you are charting year-end stock results for inclusion in a stockholder's bulletin, you may find that a more elaborate graphics package better suits your needs.

Using Painting Programs

PAINTING PROGRAMS REQUIRE some artistic ability. They require that you use "pens" and draw/fill patterns to create images by drawing "freehand." Pictures are stored as dots that can't be changed, so it's important that you know ahead of time what you want to create. Once created, images can be erased or moved around the screen, but they cannot be reduced in size or changed easily.

When completed, you can direct your graphics to the printer connected to your PC. Be aware, that painting programs, which operate independently of output devices, do not allow you to take advantage of the high resolution of a laser printer. For example, uneven, jagged edges produced while creating an image on the screen result in uneven, irregular images on a printed page. Because of the jagged appearance of graphics created with painting programs, people typically use

these graphics for informal communications and entertainment.



HP's Graphics Gallery offers high-quality graphics for your PC.

You also may not be pleased with the results from scaling — enlarging or reducing a picture — because the individual dots have been designed for a fixed-sized picture. For example, by enlarging a circle, you also enlarge the dots that create the jagged edges.

Many painting programs, such as PC Paintbrush from Zsoft Corporation, are available. Generally, these painting programs cost less than \$100.

No doubt, painting programs can be fun, especially if you're the creative type, have the time and artistic inclination to play around with images and are not concerned with the relatively low-quality printer output.

Using Business Graphics Programs

A TYPICAL BUSINESS GRAPHICS package, on the other hand, provides a greater range of capabilities and a more complex and varied output.

Business graphics programs can include several components: a charting program, a graphics program and a mapping program. A charting program, such as Hewlett-Packard's Charting Gallery or Ashton-Tate's Chart-Master, may be used to create presentation-quality bar, line, pie and scattergram charts from numerical data. And the fact that many charting

programs allow data to be integrated directly from Lotus 1-2-3 files or other programs, such as dBASE II and Symphony, eliminates the need to re-enter data, labels and other information from charts.

Drawing programs, such as HP's Drawing Gallery or Lotus Development's Freelance Plus, may be used to illustrate ideas through text, slides, organization charts, symbols or other figures. Many drawing programs contain illustration libraries consisting of thousands of pre-designed images, symbols and icons, which are available for enhancing presentations. The use of these built-in illustrations eliminates the need to draw figures for marketing, finance, data processing, administrative support, chemical and petrochemical applications. Graphics programs also can be used to customize and edit charts from companion charting products.

Mapping programs, which are fairly new, are similar to charting programs. They may be used to create and display data of a geographical nature, such as areas serviced by a travel agency or airline, or to show the location and number of sales offices or manufacturing plants within a country.

OUTPUT QUALITY, OFTEN OVERLOOKED in a graphics package, can mean the difference between professional-looking graphics suitable for formal presentations or reports and mediocre graphics only suitable

for informal communication and rough drafts.

The quality of output depends on your software, the availability of both color and gray scale, the number and quality of fonts, as well as the output devices themselves. Extremely important is the variety and quality of picture libraries.

Unlike a painting program, a business graphics program can give you the flexibility to change an image as many times as needed. Editing during creation lets you fine tune, rotate and scale images to the desired size.

What happens if you create a document in color and now want to send it to a monochromatic printer or plotter? With some packages, the entire image comes out in black. But a quality graphics program automatically will provide a range of shades from lightest gray to black, similar to what you see when watching a color TV program on a black and white TV. For example, you can take the same picture that was created in color, send it to a non-color output device and automatically receive the picture in varying shades of gray.

When you first create a graphics document, you may intend only to send it to a laser printer for a paper copy. But you should consider the possibility of a future need to produce the same images on overhead transparencies and 35mm slides for presentations.

Equally important is the need for the graphics package you choose to support a variety of output devices including

plotters, dot-matrix and laser printers and file recorders. It's more economical to use a printer for high-volume reports and reserve a plotter for those times when your graphics must look top-notch.

Because business graphics programs produce higher quality output and have greater capabilities than painting programs, graphics programs usually cost several hundred dollars more. Elements of a business graphics program usually can be bought either separately or in a package, which may be cheaper. For example, HP's Charting Gallery costs \$295 and its Drawing Gallery costs \$395. The HP Business Management Portfolio costs \$95. If all three are bought separately, the cost is \$785; if they're bought together, the cost is \$695.

Graphics And Desktop Publishing

VISUALS CREATED WITH either painting or business graphics programs can be combined with spreadsheets and text into a single document using desktop publishing. This integration provides power and flexibility to communicate more effectively and professionally.

Consider this scenario, which might apply to a marketing manager for an automobile dealer, a bank or a real-estate office. The marketing manager feels that pulling together certain in-

[WHAT TO LOOK FOR IN BUSINESS GRAPHICS PROGRAMS]

If you are considering buying a business graphics software program, these are some features to look for:

Color: Not only does color enhance a graphics presentation, but an automatic gray scale for black and white output often can supply many of the benefits of color.

Desktop publishing: You should be able to bring your graphics into a page-layout program to create an illustrated report or newsletter.

Drawing capability: This ability to create custom drawings allows you to move beyond pre-configured images that may not fit your needs exactly.

Graphical interface: The use of pull-down menus and a mouse (for drawing) are the fastest and easiest ways to use a business graphics program.

Graphics editing, enlargement and reduction: You want to be able to edit, enlarge and reduce ready-made images to fit your needs.

Illustration libraries: A good graphics package should not depend on your artistic ability. Instead, it should provide built-in, professional images including borders, fancy frames, designer alphabet and a wide selection of bullets for emphasizing major points, as well as basic shapes, arrows, curves and flowchart symbols. You also may want to have a portfolio of pictures, icons, fonts, drawings, symbols and calendars to fit your career area such as general business, mathematics or chemistry.

Integration of charting and graphics packages: You should be able to bring together elements from different packages, insert one image inside another and ensure proper fit, and still have all lines visible from the original images.

Lotus integration: If you are a Lotus user, you'll appreciate the ability to enhance charts from Lotus worksheets without going through any conversion routines.

UNDO function: In case you change your mind or make a mistake, you should be able to go back one level to override the last function you did.

Variety of output devices: After creating your graphics, for greatest flexibility and productivity, your output options should include as many of the following as possible: laser printer, dot-matrix printer, plotter and film recorder. These devices will enable you to present your graphics on paper, overhead transparencies and 35mm slides.

WYSIWYG or "what you see is what you get": For designing and laying out graphics, it's important that the fonts and images you see on the screen are the same as you see on paper, which eliminates guessing and speeds creation of graphics.

Zoom feature: If you do a lot of detail work, you need to be able to isolate individual parts of an image, enlarge them and make subtle changes.

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Charting Gallery, Drawing Gallery, Business Management Portfolio

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Chart-Master, dBASE

Ashton-Tate
20101 Hamilton Ave.
Torrance, CA 90502
CIRCLE 285 ON READER CARD

Freelance Plus, Symphony

Lotus Development Corporation
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CIRCLE 284 ON READER CARD

PC Paintbrush

Zsoft Corporation
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Suite 100
Marietta, GA 30067
CIRCLE 283 ON READER CARD

formation will help other company executives understand trends and the effectiveness of recent marketing campaigns. Spreadsheets and graphs created with Lotus Symphony and other programs can show highs and lows in sales. Also, charts comparing such factors as performance and overhead of local and regional offices can be helpful in pinpointing causes of successes and failures.

Once created, these charts and graphs can be brought

directly into a business graphics program. A word processing program can be used to create text explaining the visuals.

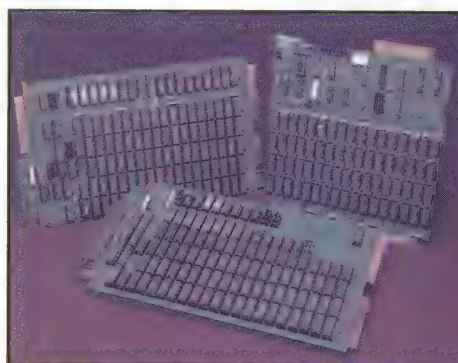
Initially, overhead transparencies in color can be presented in an informal report to the marketing manager's immediate manager. After receiving suggestions, the marketing manager can change the graphics easily. For distribution to a wider audience, additional text can be included, thereby reinforcing the message of the visuals.

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The graphics packages available — from painting programs to business graphics programs — possess different capabilities and strengths. Properly used, either type of program can save time for managers, secretaries and business professionals; decrease the cost of producing slides, reports and transparencies; and enhance the quality of visual graphics presentations. —*Marie Bernard is a business graphics product manager at Hewlett-Packard's Personalized Software Division in Santa Clara, CA.*

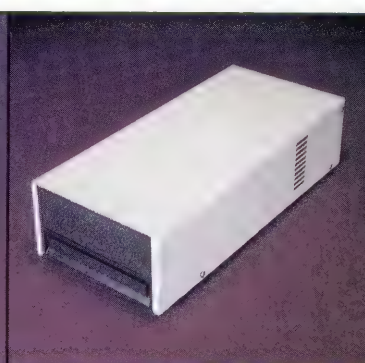
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B EYOND WINDOWS WITH NEWWAVE

Porting MS Windows Applications Into The NewWave Environment

The release of the HP NewWave developer's kit represents a quantum leap forward in user interface technology for the HP Vectra and IBM PC-compatible world. Constructed on top of the Microsoft Windows operating environment, the NewWave environment has all the benefits of Windows: hardware device independence; non-preemptive multitasking; and a friendly, straightforward graphical user interface.

NewWave expands into frontiers untouched by Windows. NewWave provides a friendlier, object-oriented method of doing your work. In addition, there is task automation and dynamic data sharing between objects as well as a flexible system for generating on-line help and computer-based training (a future addition to NewWave).

Traditionally, the MS-DOS file system requires users to keep track of numerous executable programs and the data files that are associated with each (e.g., .WRI data files are associated with the Windows Write application). Under NewWave's object-oriented system, a user thinks of an object, which consists of the application and its data file. The object itself can be concealed or represented as an icon or window on the screen.

The Object Management Facility (OMF), the NewWave environment manager, performs the hard work of maintaining the links between the components of an object and among the objects themselves. Thus, the user is freed from having to worry about how to use these tools to perform daily tasks. Programmers now can concentrate directly on the tasks at hand.

Furthermore, the NewWave Applications Programming Interface (API) can record and playback events. "Agents" enable a user to per-

form repetitive and mundane tasks, such as reading electronic mail or dispatching daily status reports. This same API also has comprehensive facilities to empower, encourage and orient the user with general and context-sensitive help. The result is an enthusiastic and productive user who masters a new object (application) more quickly.

NewWave Objects And The Object Management Facility

Before we look at the details about how a Windows application is modified to work under the NewWave environment, we first have to understand some fundamental NewWave concepts.

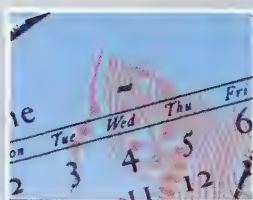
NewWave is constructed on the primitive notion of an object. The object consists of an executable program plus one or more associated data files. Objects associated with the same executable program are considered to be of the same class.

Objects can be differentiated in several ways: system objects versus user objects, container objects versus data objects and simple objects versus compound objects.

System objects represent fixed resources of the NewWave environment. The file drawer, the wastebasket and the NewWave environment itself are system objects. Represented as icons, system objects cannot be copied, cut or shared by the user. A system tool is a special system object that serves as a general utility application, such as a clock.

User objects, on the other hand, are those resources that the user has control over. Examples of user objects are spreadsheet programs or a graphics drawing program. User objects can be copied, cut or shared.

A *container object* is an object that holds other objects. A container object may be a sys-



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tem object (e.g., the file drawer) or a user object (e.g., a folder). The contained objects are represented by their icons and names.

A *data object* is a user object that holds actual application data, such as text, graphics, spreadsheets, voice, etc. Data objects fall into two categories: simple and compound (or composite). A simple data object has homogeneous data, i.e., all the data is associated with the same application. On the other hand, a compound data object has data from two or more different applications. A newsletter publication could be viewed as a compound object; its data could have originated from a word processor, a paint program or an image scanning program.

All of these object traits and relationships are maintained by the Object Management Facility (OMF). Specifically, the OMF does the following:

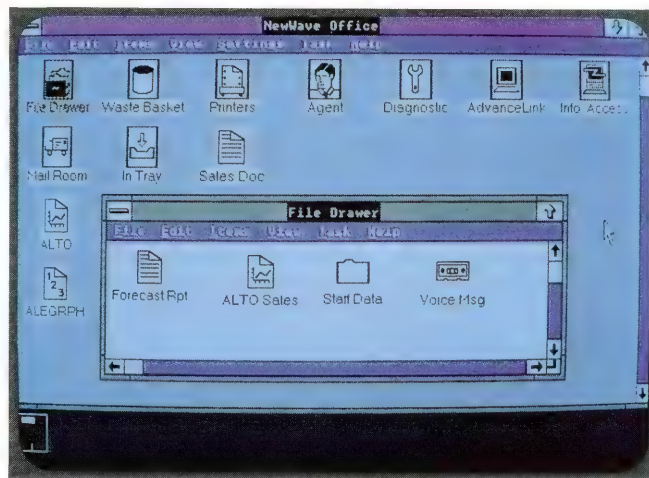
- binds the object's data file to its executable application
- tracks and updates the relationships between different objects
- regulates communication between objects through a predefined set of messages
- manages the object's data files in a manner such that the user need not worry where the data files are stored or which files are for what applications.

Properties

The characteristics of an object are called properties. Each property has a name and a value and is assigned by the software developer. The properties of an object can consist of a title, comments, date of creation, the creator, etc. The properties of an object can be accessed through certain OMF function calls (OMF_ReadProperty and OMF_WriteProperty). A property also can be distinguished as either a class property or an object property.

Class properties are those properties that are common to all objects associated with the same application. Such objects have the same class name, icon and methods.

Object properties are those properties that are unique to a particular object. For



The NewWave environment has all the benefits of Windows: hardware device independence; non-pre-emptive multitasking and a friendly, straight-forward graphical user interface.

instance, an object's title and time of creation are features unique to the object.

Methods

In the NewWave environment where one object makes a request to another object, via the OMF, to perform a task, the target object must be capable of responding. The capability to respond to a message is called a method. Responding means that the target object can recognize a type of message and execute the appropriate code.

The object must inform the OMF that it has the method to respond to a particular message. Within the object's application, there has to be a procedure (HasMethod) to acknowledge to the OMF that a method is supported (METHOD_PRESENT) or not (NO_METHOD). Furthermore, the object's installation file (.IN\$) must list its supported methods under the HAVE_METHODS heading. This allows another application to determine if a certain method is supported when the object is in an inactive state.

There are four methods that each NewWave application is required to support: CREATE_OMF, TERMINATE, DIE_PLEASE and HAS_METHOD. CREATE_OMF results from the OMF's initialization and is part of the object's OMF-dependent activation process. TERMINATE is a message to release the object's ties to the OMF, whereas DIE_PLEASE (not WM_DESTROY) is the message to destroy the object's win-

dow and post a quit message. HAS_METHOD is the message from other objects to inquire about the availability of certain methods. The code for all these methods is contained in a single function that might be called MessageFromOMF.

The Applications Programming Interface

The Applications Programming Interface (API) is the programmatic interface to special NewWave facilities: the Agent, which provides task automation; the Help Facility, which provides in-depth, on-line assistance; and computer-based training (CBT), which is a comprehensive tutorial subsystem for users who are new to the product.

The API can be thought of as a message monitoring system that works behind the scenes. In order for your application to access the API facilities, it is very important to structure the code according to the order of a predefined architecture. Whereas in traditional Windows programming, there is a Windows procedure that recognizes AND reacts to a particular message, these two functions are separated in a NewWave program. A procedure called the Action Processor handles the message recognition while another procedure called the Command Processor actually executes the reaction to the message. This differentiation is important as it allows the API to interact with the application.

Furthermore, in the case of record-

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¹ "The Three Pillars of EIS" by David Friend, August 1988

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4. Hewlett-Packard. *HP NewWave Environment: Programmer Reference Manual*. Santa Clara, California, 1988.
5. Hewlett-Packard. *HP NewWave Environment: User Interface Design Rules*. Santa Clara, California, 1988.

ing and playback, the developer has to define a task language understood by the application as well as define the data structures for a message's internal and external format. The internal format is understood by the application while the external format is understood by the API. The main difference between the two formats is that the external format cannot contain pointers or references. This is very important because the API will keep the tasks on file whenever the object is inactivated. That being the situation, the developer also must incorporate procedures for translating the internal format to the external format and vice-versa whenever recording or playback is about to take place.

The API sends messages to the application through Windows. Those messages are `API_PLAYBACK_MSG`, `API_SET_MODE_FLAGS_MSG` and `API_INTERROGATE_MSG`. An `API_PLAYBACK_MSG` means that the API is holding an external command that has to be translated into an internal format before the application can process it further. The `API_SET_MODE_FLAGS_MSG` is a request to reset the bits in the `APIModeFlags` field to change the flow of control in the application. Finally, the `API_INTERROGATE_MSG` is an inquiry from the Agent, Help facility or CBT to the application for specific information.

The Sample Application: Visions

The original Windows application that was ported to the HP NewWave environ-

ment is a simple fractals program called Visions. Visions has six different fractals, each based on a primitive box pattern consisting of horizontal and vertical line segments. Starting with the basic box pattern, a "depth" is attained as each of the line segments is substituted with the basic pattern.

From this result, another depth is attained as each of these segments is substituted with the basic pattern, and so on. Theoretically, the design would look more "realistic" if actual drawing took place at a depth of many levels. However, because we are restrained by the physical limitations of our video devices, the fractal designs have been set up to be drawn at a depth from four to six levels. These figures seem to make optimal use of current EGA and VGA hardware.

The source files for both the Windows and the NewWave versions of Visions are available on disc. At the end of this article, you'll be instructed on how to get your copy.

Walking Through Visions For NewWave

The following highlights the NewWave features that were added to the original Visions program for Windows.

WinMain:

Just like Winapps, NewWave applications require the registration of the window class. However, unlike Winapps,

NewWave applications must use the `NW_CreateWindow` function to create the window. The OMF also must be initialized with the `OMF_Init` function, which registers the object's window handle with the OMF and retrieves the root file name of the object's data files. For the API, the object's handle to the API is initialized to `NULL`, and the accelerators to the API's task or help menu items are loaded.

Note that even though there is considerable drawing to be done for a single fractal pattern, the program is designed in such a way that the application does not hog the CPU for the entire duration of the drawing (provided the message is not an API playback request). With the help of the Windows `PeekMessage` function, the application alternates between drawing a small portion of the pattern and processing a Windows or NewWave message (at the same time allowing similarly constructed pro-

grams to run concurrently as well).

A01_VisionsWndProc:

This is the Windows procedure under NewWave. Unlike the Windows counterpart, the architecture of this procedure is completely different. First of all, the `NW_MessageFilter` function has to be used to determine if the message should be handled by Windows or by the application. If it should be handled by the application, a test is taken to see if intercept mode is on (`APIInterceptOn`), or an item had been selected from the API task or help menus (`APIHaveMenu`). If that is the case, the API handles the message with `APIUserActionInterface`.

The application then tests to see if there is a message to be processed with `APIHaveMessage`. If true, the application has to test if the message is an API playback message or not. If it is a playback message, the message is passed to `A30_TranslateToIntProcessor` for translation to internal format. If it is not a

playback message, it is passed to `A10_ActionProcessor`.

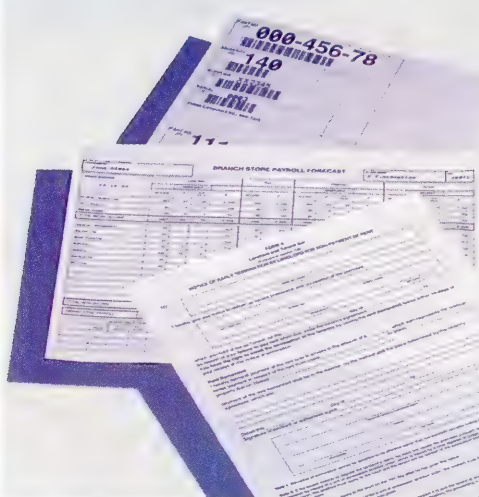
Next, the application tests to see if there is a valid internal command (`APIHaveCommand`). If there is, the command is processed by `A20_CommandProcessor`.

Finally, the application must check if it is in playback or record mode (`APIPlaybackOn` or `APIRecordOn`). If it is in record mode, the message must be translated from internal to external format in `A40_TranslateToExtProcessor` and then have the result recorded by the API. In either case, the API Agent has to be informed that the command has been completed and that the application is ready to receive the next command.

A10_ActionProcessor:

This procedure accepts input from various origins: Windows, the OMF, the API or the user. If it is a Windows message (such as `WM_CREATE` or `WM_PAINT`) or an OMF message

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(WM_OMF), the response is executed from within this procedure. If it is an API message such as API_SET_MODE_FLAGS_MSG, the global mode bit flags must be changed to regulate the flow of control. If wParam is ON, the value must be ORed with gAPIModeFlags, whereas if wParam is OFF, the value must be ANDed with gAPIModeFlags. Otherwise, all user commands must be converted to internal form for the A20_CommandProcessor routine. In this case, internal commands must include the usual Windows minimize, maximize, restore and close commands as well as any commands from the user's task language (e.g., NEW_FRACTAL).

A20_CommandProcessor:

This procedure receives the user action messages from A10_ActionProcessor or the playback messages translated from A30_TranslateToIntProcessor. Minimize, maximize and restore messages must make use of the NewWave NW_Minimize, NW_Maximize and NW_Restore functions. Closing or deactivating the NewWave window not only involves concealing the window display, but also notifying the API Agent to stop sending messages to the application (APINotReady) and informing the object's parents of its position so that it can return to an icon (OMF_Closing).

Finally, the NEW_FRACTAL command will call B30_VisionsMenuProc, which will check off the current fractal on the menu and retrieve the current fractal's values. Note that minimize, maximize or restore messages will reset the drawing flags and clear out the stack that regulates the state of the drawing (C50_Reinitialize_Controls). This is done to allow the pattern to be redrawn within the context of its changed client area.

A30_TranslateToIntProcessor:

Whenever a playback command comes from the API, this procedure translates the message from external format to the application's internal format. The type definition names PINTCMDSTRUCT and LPAPICMDSTRUCT already are present

in the "nwapi.h" header file. What the programmer needs to do is to define the data structures of these type definitions according to the needs of the application, keeping in mind that LPAPICMDSTRUCT must consist only of value parameters as components.

The API external message is retrieved by getting a pointer to the memory location whose value is LOWORD(lParam). After having defined the external and internal task language commands, the conversion is done simply by checking the external command in a switch statement and making the corresponding conversion.

A40_TranslateToExtProcessor:

This procedure is called whenever the application is in recording mode. In this case, the message is in the application's internal format and must be translated to the external format so that it can be understood by the API. The process is essentially the opposite of that for A30_TranslateToIntProcessor.

In addition, the size of the actual external command also must be calculated and recorded for the API.

B40_VisionsPaintProc:

This procedure is called as a result of a WM_PAINT message in A10_ActionProcessor. If the message originates from user input, Windows or the OMF, the drawing flags and the stack are reinitialized (C50_Reinitialize_Controls) and drawing resumes in WinMain outside the message polling loop. However, if the message originates from an API playback request, all drawing is performed in this procedure. This scheme ensures that each recorded task is carried to fruition.

B50_MessageFromOMF:

All of the messages coming from the OMF to the object are handled in this routine. The wParam variable is examined for the type of OMF message and the appropriate process is performed. After the call to OMF_Init, the OMF



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sends a `CREATE_OMF` command whereby the object has to open and read its data file, get a handle to its property list, read its object title, register the handle of its window with the API and set up the API task menu.

All of this is part of the object's activation process. If the OMF message is `OPEN` or `WARM_START`, the object sets up its title on its window caption and informs its parents to telescope from an icon to a window display (`OMF_Opening` and `NW_Restore`).

The `APIReady` function is used to inform the API that the object is ready to receive API messages. A `WARM_START` is very much like `OPEN` except the object can use and regard any context and state information from the previous session as valid. If the message is `TERMINATE`, the object's data file is saved, the API is informed that no further communication from the object will take place (`APITerm`) and the object frees its handle to the OMF (`OMF_Term`).

If the OMF message is `DIE_PLEASE`, the NewWave window is destroyed and the `PostQuitMessage` routine is executed. In a NewWave application, it is the OMF, not Windows, that makes the request to terminate the program. Finally, if the message is `HAS_METHOD`, another object has made an inquiry as to whether a particular OMF message is supported or not. In this case an affirmative or negative response is retrieved from the `C20_HasMethod` function. — *Frederick Chew is an HP Customer Support Engineer.*

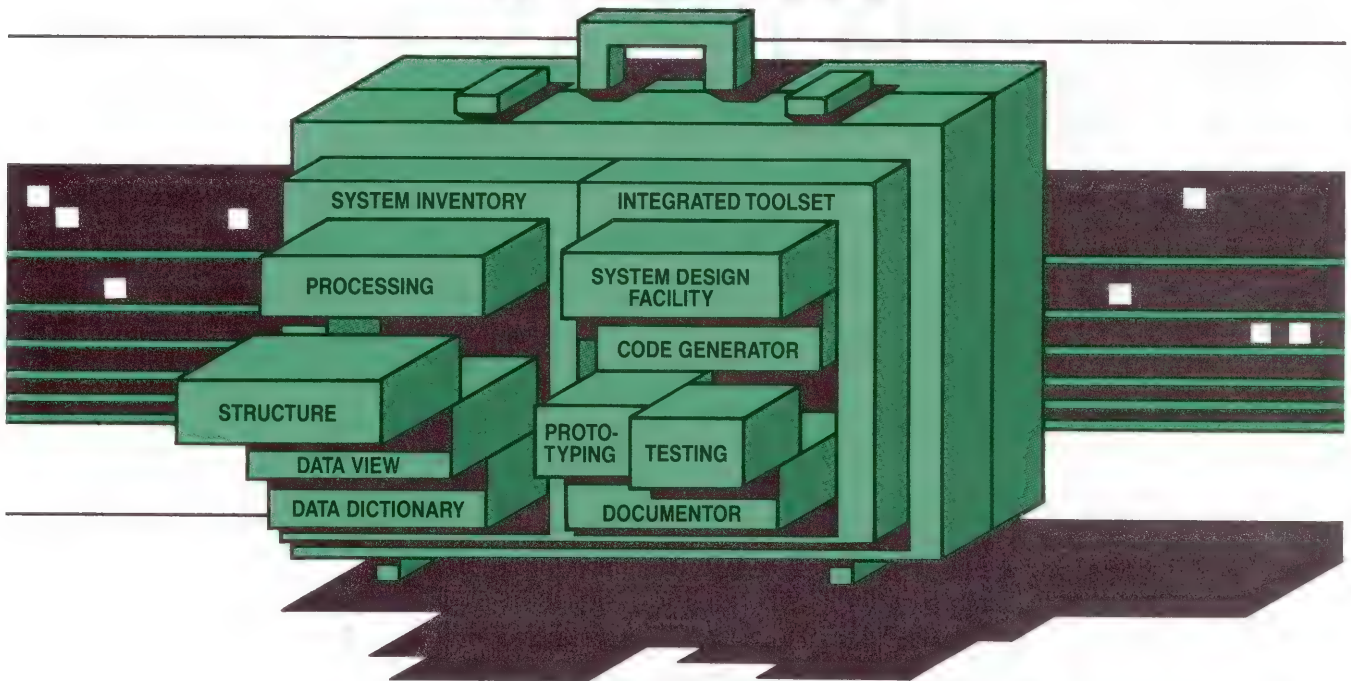
Editor's Note: HP Professional will supply the source code for porting the Windows application, discussed in this article, into the NewWave environment on a 5¼-inch floppy disc. To receive your free copy, please forward a self addressed floppy mailer and a five-dollar check (payable to Professional Press) to handle the cost of the diskette and postage fees to: Editor, HP Professional, 921 Bethlehem Pike, Spring House, PA 19477.

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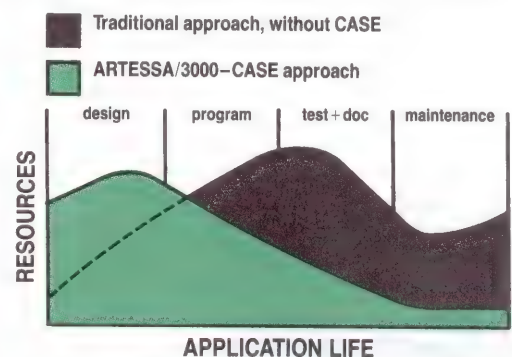
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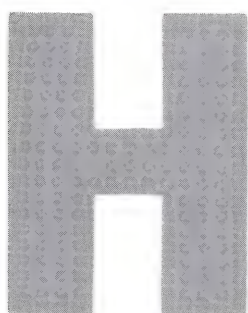
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Programming In Prolog, Part 2

HYPOTHESIS-DRIVEN PROGRAMMING

Editor's Note: In Part 1 of this article, Ross Hopmans introduced the basics of artificial intelligence, knowledge-based systems, logic programming and the Prolog language to establish the groundwork for and a means to implement goal-oriented or hypothesis-driven programming. In Part 2, Mr. Hopmans discusses how Prolog works and how you program in Prolog.

In Prolog programs, the control is similar to conventional procedural languages as long as the computation progresses forward. Hypothesis invocation corresponds to procedure invocation, and the ordering of hypotheses in the body of clauses corresponds to the sequencing of statements. The differences show when backtracking occurs. In a conventional language, if a computation cannot proceed (e.g., all branches of a case statement are false), a runtime error occurs. In Prolog, the computation simply is undone to the last choice made, and a different computation path is attempted.

The data structures manipulated by logic programs (terms) correspond to general record structures in conventional programming languages. The handling of data structures is very flexible in Prolog. Like LISP, Prolog is a declaration-free, typeless language. Logical variables refer to individuals rather than memory locations. Consequently, having specified a particular individual, the variable cannot be made to refer to another individual. In other words, logic programming does not support destructive assignment where the contents of an initialized variable can change.

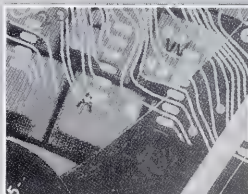
A question to Prolog is always a sequence of one or more hypotheses. To answer a question, Prolog tries to satisfy all the hypotheses. To satisfy a hypothesis means to demonstrate that the hypothesis is true, assuming that the

relationships in the program are true. In other words, to satisfy a hypothesis means to demonstrate that the hypothesis logically follows from the facts and rules in the program. If the question contains variables, Prolog also has to find what the particular objects (in place of the variables) are for which the hypotheses are satisfied. If Prolog cannot demonstrate for some instances of variables that the hypotheses logically follow from the program, Prolog's answer to the question will be "no." Prolog accepts facts and rules as a set of axioms and the user's question as a conjectured theorem; then, it tries to prove this theorem — that is, to demonstrate that it can be derived logically from the axioms.

The graphical illustration of an execution trace has the form of a tree. The nodes correspond to hypotheses and the arcs to the application of alternative program clauses that transform the hypotheses at one node into hypotheses at another node. The top hypothesis is satisfied when a path is found from the root node to a leaf node labeled "yes." A leaf is labeled "yes" if it is a simple fact. The execution of Prolog programs is the searching for such paths. During the search, Prolog may enter an unsuccessful branch. When Prolog discovers that a branch fails, it automatically backtracks to the previous node and tries to apply an alternative clause at that node.

Declarative Vs. Procedural Meaning

We distinguish between two levels of meaning of Prolog programs: namely, the declarative meaning and the procedural meaning. The procedural meaning is concerned only with the relations defined by the program. The declarative meaning thus determines what the output of the program will be. On the other hand, the procedural meaning also determines how this

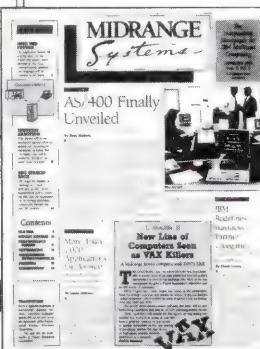
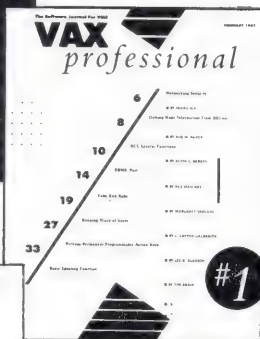
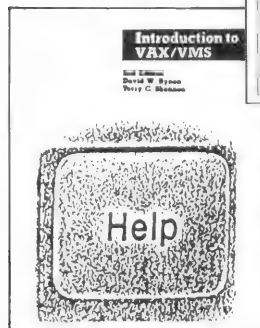
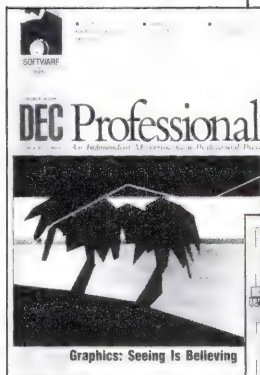


PROGRAMMING

Ross G. Hopmans

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[THE HISTORY OF PROLOG]

Prolog's two founders, Robert Kowalski (Edinburgh) and Alain Colmerauer (Marseille), worked on similar ideas during the early 70s and even worked together during one summer. The results were the formulation of the logic programming philosophy and computation model by Robert Kowalski (1974) and the design and implementation of the first logic programming language, Prolog, by Alain Colmerauer and his colleagues (1973).

A more potent force behind the realization that logic can be the basis of a practical programming language has been the development of efficient implementation techniques, as pioneered by Warren (1977) with the Prolog-10 compiler.

In spite of all the theoretical work and exciting ideas, the logic programming approach seemed unrealistic. The main claim was that languages such as Prolog were hopelessly inefficient and difficult to control and could not prove a substitute for LISP. In the mid to late 70s, the Prolog-10 compiler was developed and dispelled all the myths about the impracticality of logic programming. That compiler delivered performance comparable to the best LISP systems available at the time. Furthermore, the compiler itself was written almost entirely in Prolog, suggesting that classical programming tasks, not just sophisticated AI applications, can benefit from the power of logic programming.

No doubt logic programming would have remained a fringe activity in computer science for quite a while longer were it not for the announcement of the Japanese Fifth Generation Project in October 1981.

The syntax of Prolog stems from the clausal form of logic due to Kowalski (1974). Warren adapted Marseille Prolog for DEC-10, and many systems adopted most of the conventions of Prolog-10, which has become known more generically as Edinburgh Prolog. Its essential features are described in the widespread primer on Prolog (Clocksin and Mellish, 1984).

output is obtained, that is, how the relations actually are evaluated by the Prolog system.

Consider the clause $P :- Q, R$. Some alternative declarative readings of this clause are:

P is true if Q and R are true.

From Q and R follows P.

Two alternative procedural readings of this clause are:

To solve problem P, first solve subproblem Q, then subproblem R.

To satisfy P, first satisfy Q and then R.

The procedural reading not only defines the logical relations between the head of the clause and the hypotheses in the body, but also the order in which the hypotheses are to be processed.

The declarative meaning of programs determines whether a given hypothesis is true, and if so, for what values of variables is it true.

The procedural meaning specifies how Prolog answers questions.

$P :- P$ is declaratively quite correct but procedurally useless and can cause problems to Prolog as it results in an infinite loop. What is unusual about Prolog is that the declarative meaning of a program may be correct, but the program is, at the same time, procedurally incorrect because it is unable to produce an answer to a question.

A practical heuristic in problem-solving is that it often is useful to try the simplest idea first.

The reason we should not forget about the declarative meaning is that progress in programming technology is achieved by moving away from procedural details toward declarative aspects, which normally are easier to formulate and understand. The system itself, not

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Program 1.

PRODUCT benefits CUSTOMER if
CUSTOMER is-involved-with BUSINESS and
PRODUCT improves BUSINESS.
PRODUCT benefits CUSTOMER if
CUSTOMER employs PROFESSIONAL and
PRODUCT increases-productivity-of PROFESSIONAL.

PRODUCT improves BUSINESS if
BUSINESS requires TOOL and
PRODUCT enhances TOOL.

hewlett-packard is-involved-with computers.
westinghouse is-involved-with power-plants.
metropolitan-life is-involved-with insurance-policies.

power-plants require regulatory-analysis.

insurance-policies require insurance-underwriting.

prolog enhances expert-systems.
prolog enhances natural-language-processing.
prolog enhances insurance-underwriting.
prolog enhances regulatory-analysis.

hewlett-packard employs software-engineers.

prolog increases-productivity-of software-engineers.

Program 2.

benefits(PRODUCT,CUSTOMER) if
is-involved-with(CUSTOMER,BUSINESS) and
improves(PRODUCT,BUSINESS).
benefits(PRODUCT,CUSTOMER) if
employs(CUSTOMER,PROFESSIONAL) and
increases-productivity-of(PRODUCT,PROFESSIONAL).

improves(PRODUCT,BUSINESS) if
requires(BUSINESS,TOOL) and
enhances(PRODUCT,TOOL).

is-involved-with(hewlett-packard,computers).
is-involved-with(westinghouse,power-plants).
is-involved-with(metropolitan-life,insurance-policies).

requires(power-plants,regulatory-analysis).
requires(insurance-policies,insurance-underwriting).

enhances(prolog,expert-systems).
enhances(prolog,natural-language-processing).
enhances(prolog,insurance-underwriting).
enhances(prolog,regulatory-analysis).

employs(hewlett-packard,software-engineers).

increases-productivity-of(prolog,software-engineers).

the programmer, should carry the burden of filling in the procedural details.

Programming In Prolog

Prolog is related to mathematical logic, so its syntax and meaning can be specified most concisely with references to logic. But these concepts are not necessary for understanding and using Prolog as a programming tool.

Often, the key step toward a solution is to generalize the problem. By considering a more general problem, the solution may become easier to formulate.

Prolog programs consist almost exclusively of declarations. The programmer is able to leave many of the control decisions to the problem-solving mechanism. SQL has a similar declarative nature in that the user specifies what type of answer is required and the interpreter decides how to supply it.

Consider the Prolog program,

shown in *Program 1*, to describe why a product benefits a customer. The program consists of 14 statements: three rules and 11 facts.

Most Prolog implementations support the "syntactic sugar" used here to enhance the readability of the program. The equivalent, standard Prolog code is shown in *Program 2*.

The words in upper case are Prolog variables. Variables are local to a statement so that each rule can be understood in isolation.

In this program, "benefits" and "improves" are rules whereas "is-involved-with," "requires," "enhances," "employs" and "increases-productivity-of" are all facts. Prolog, however, does not differentiate between facts and rules. In other words, we quite correctly add a new fact:
benefits(prolog,brant).

This Prolog program contains a knowledge base of facts and rules, which we can use in many different ways. To execute any portion of the program, we

give it a hypothesis or goal. The following hypotheses succeed simply because they exist in the fact base:

enhances(prolog,expert-systems).
is-involved-with(hewlett-packard,computers).
employs(hewlett-packard,software-engineers).

Similarly, the following hypotheses fail because they cannot be proven correct:

enhances(prolog,data-processing).
employs(brant,software-engineers).

Using the rules, we can hypothesize about a particular solution, such as:

(1) *benefits(prolog,hewlett-packard)*

or, our goal may be to find a solution, such as:

(2) *benefits(prolog,CUSTOMER).*

In case (1), the hypothesis would succeed because the second "benefits" rule can be applied successfully to the facts provided. In case (2), the hypothesis

would succeed, returning the first value of the variable CUSTOMER for which it did succeed. In this case, the value returned would be "westinghouse."

Through its backtracking capability, Prolog is able to return all the values of variables for which the hypothesis succeeds. For example: *benefits(prolog, CUSTOMER), fail.*

would locate all instances of CUSTOMER for which the hypothesis is true. By explicitly telling the hypothesis to fail after successfully finding a value for CUSTOMER, the inference engine will attempt to solve for the hypothesis in all possible ways.

In fact, using:
benefits(PRODUCT, CUSTOMER), fail.

Prolog will find all PRODUCT/CUSTOMER tuples for which the hypothesis is true.

This small, simple, example program begins to illustrate the power of

this type of programming. Programmers tell Prolog what they know. They provide the program with facts and rules, and they then can hypothesize about anything in the knowledge base.

It is the inference engine and not the programmer that takes on the burden of solving the problem by doing the symbolic inference, pattern matching and tree searching.

Conclusion

As powerful as the numeric tools are, there is relatively little we know that can be expressed reasonably as numbers. But the computer is not a calculator; it is a general purpose symbol manipulator.

The beauty of this technology so far is that it seems appropriate to all industries. The leaders have been in finance, manufacturing and insurance, but everyone is participating.

Hypothesis-driven or goal-oriented programming is a means of implementing logic programming using the Prolog

language. The whole purpose is to program at a higher level.

Because you tell the computer what you know about the problem rather than how to solve the problem, you can achieve vast improvements in productivity. Programs make sense and can be proven correct, so they take less time to write, test and debug.

Most importantly, you are capturing the *knowledge* about the problem. *In the knowledge lies the power.* The programs work because of the base of knowledge about the case at hand.

Maybe the real computer revolution is yet to come — to use the computer to do reasoning. That is what AI and the much talked about fifth generation is all about. — *Ross Hopmans is the manager of Artificial Intelligence Initiatives at Brant Computer Services Limited, Mississauga, Ontario, Canada.*

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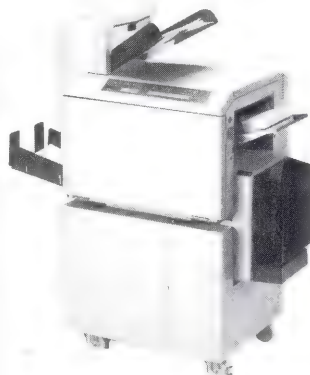
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NewWave Versus The Mac



DESKTOP PUBLISHING

Ashley Grayson

Apple Computer Inc. recently has brought attention to Hewlett-Packard's NewWave product with their lawsuit against HP and Microsoft. Rather than add to the controversy surrounding that suit by commenting on its relative merits or reprinting old news, we'll look at NewWave and how it typifies industry trends and relates to the Apple Macintosh it is supposed to infringe.

Should an organization with an investment in Vectra PCs and HP LaserJet family printers be interested in Apple products, specifically the Macintosh, or will NewWave deliver something better? Does NewWave offer anything that competes with Macs? Is it more? Less? Just a clone of an interface? What's all the fuss about?

The Current Status

At the highest level, NewWave is NOT a look-alike graphical interface that makes PC products running Microsoft Windows look like Macintoshes. Rather, it is an integrated PC strategy that enables Hewlett-Packard to sell itself as an information processing solution at the highest corporate level.

The fact that the NewWave interface resembles the Mac is actually an unfortunate distraction from the real value of the concept. NewWave is a strategy more than a product because it isn't a single piece of hardware or software. Rather, it is a set of standards, specifications and tools that enable diverse hardware and software packages to work together. The NewWave environment also includes tools for adding on-line help and tutorials to an application.

Hewlett-Packard is very careful to

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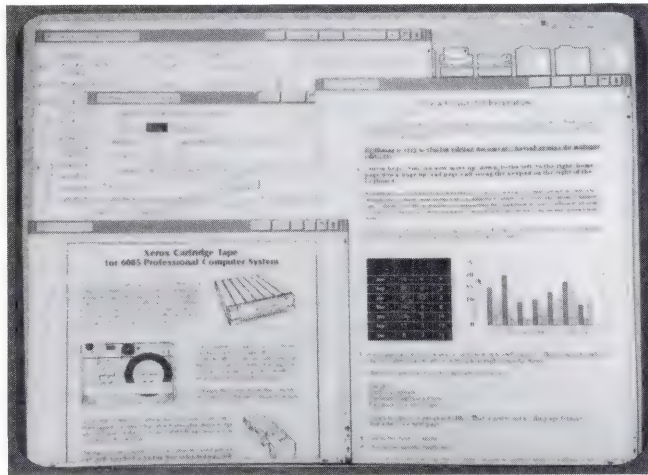


Photo courtesy of Xerox Corporation.

position the current NewWave offering as a Developer's Toolkit rather than an application. NewWave will provide capabilities not found in any other operating system for interconnecting applications. However, users can benefit from the NewWave environment only if developers modify their software to work within NewWave.

Microsoft Windows, under which NewWave runs, can be used immediately to run existing applications, NewWave cannot. The long term value is considerable because two applications running under NewWave can work together for the user without knowing about each other. For example, a future spreadsheet dynamically can update the tables in a report stored in a future desktop publishing package. More importantly, the spreadsheet can pull data from an HP 3000 departmental computer, because NewWave potentially can exist on every computer in the company.

Comparatively Speaking

For the PC or Vectra user, the MS-DOS-based applications development environment will have to catch up to the NewWave concept. HP believes that

Xerox Viewpoint is an integrated system that displays information from diverse applications in a uniform, familiar document format.

once an application program is converted to Microsoft Windows, it will be a simple next step to support NewWave. (Microsoft already has announced a NewWave version of EXCEL.) This is probably true, but making two programs talk to each other is only part of the battle.

What they will say to each other is the major challenge and will involve more than a small matter of programming. Diverse applications vendors will have to begin talking to each other about how users will use their products in concert with other products. To see how all this may work, let's compare the MS-DOS-based PC with the Macintosh. Following some pretty specific details, we'll return to the strategic issues.

The Macintosh computer is designed to run one program at a time for one user, but also provides a facility for desk accessories (DAs) to be popped-up at the user's request. These handy utilities include a calendar, notepad, clock, etc. Third-party vendors have provided exotic DAs that manage hard discs, collect time and billing information, send and receive electronic mail, perform

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thesaurus checks, etc.

MS-DOS also is designed to run one program at a time, but leaves the loophole for a program to "Terminate and Stay Resident." This is the feature used by Borland International's SideKick, or SuperKey, and other RAM-resident programs to function similarly to the Macintosh's DAS. The difference is that the Macintosh operating system manages the DAS, while the RAM resident programs must agree among themselves in order to operate together. Individually and together, they also must be compatible with the primary applications. DOS doesn't even arbitrate among the contenders.

Most PC users have found at least one combination of useful RAM-resident programs that doesn't work. In a true multiprogramming environment, any program could be popped-up at the user's whim, and there would be no need for DA and resident programs. But being able to switch from word processing to steal a column from a spreadsheet, close the spreadsheet and paste the column into the document in process is not enough; OS/2 and Desqview can run multiple sessions — the user can word process and calculate at the same time.

A critical distinction is whether the second program knows anything about the structure of the program it is intruding on; even in the current multiprogramming environment, the word processor is unaware of what the spreadsheet is doing and vice versa. MS-DOS ignores what the user's programs (resident and otherwise) are doing because they, not MS-DOS, control the address space in the computer and control what the user sees.

Remember, the PC architecture supports both text and graphics modes and a wide variety of display formats: monochrome text, CGA, EGA, Hercules, VGA, etc. Thus it is impossible for MS-DOS to coordinate all these possibilities. In contrast, the Mac has one video format that represents everything as graphics. Programs have a uniform standard for controlling the screen, and what the user sees is supervised by the operating system.

The equivalent service on PCs was

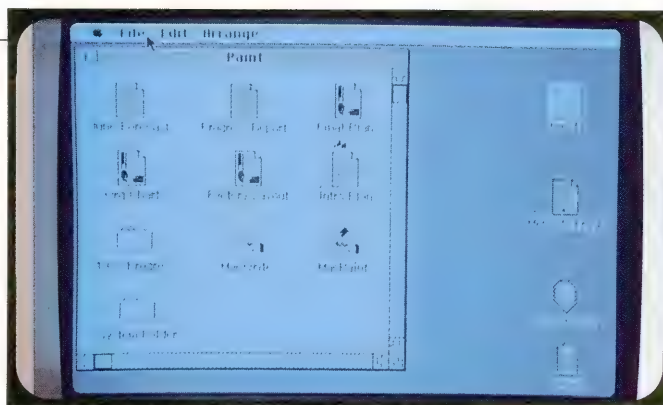


Photo courtesy of Apple Computer, Inc.

The Apple Macintosh is the most widely used interface supporting cut and paste among diverse applications.

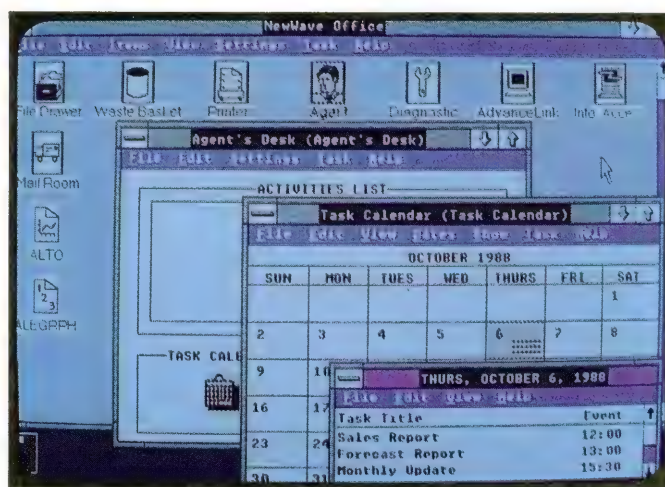


Photo courtesy of Hewlett-Packard Company.

NewWave promises applications environments on existing and future PC-family equipment.

introduced by Microsoft as a second layer of operating system called MS-Windows. Windows runs on top of DOS and manages what the user sees. Both the Macintosh and Windows include a system-wide feature called the Clipboard. This construct allows the user to duplicate any information presented on the screen into a holding area and then "paste" it into another program. If the information is removed from the source, the command is "cut"; if it is copied, the command is "copy."

This gives the user the ability to exchange data between two separate programs simply by cutting and pasting an image from the screen. It is this ability, to cut and paste, coupled with the uniform "look and feel" of all programs written for it, that gives the Macintosh its vaunted user-friendly interface. To be historically accurate, all of these elements, and several more we will discuss shortly, were developed originally by Xerox in its Viewpoint software and marketed in its Star and 6085 computer workstations. From this perspective, Apple has not been so much

a clever developer of the base technology as astute in licensing the right foundation to build on.

AS THE MACINTOSH was developed from the Star, Windows was developed from the Mac. The important difference is that the Xerox products are built around a totally integrated environment where the applications: word processing, spreadsheet, table processor and compound document composer, all collaborate invisibly for the user. The Macintosh and Windows products only duplicate the appearance of Xerox Viewpoint — not the underlying functions. NewWave is the toolkit by which MS-DOS developers can build the functionality that was omitted on the Macintosh. NewWave is more than a PC product, but its success in the PC world is tied to Windows. To date, Microsoft has been less than totally successful at selling Windows to PC users for several reasons:

■ You can buy only one kind of Macintosh, but there are lots of alternatives to Windows for PC users. Multiprogramming shells for

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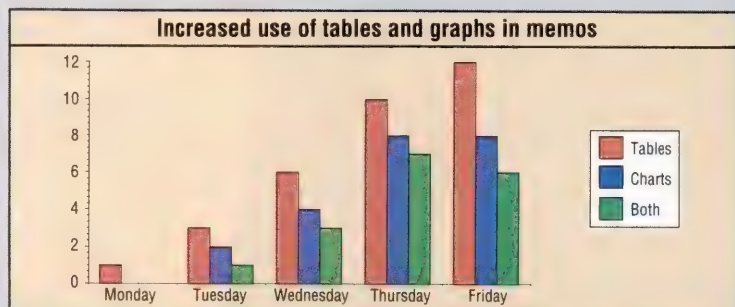


**HEWLETT
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FIGURE

To: J.J. Biggly, Top Management Date: 19 Sept 1988
 From: Harris Tweed, Dept. of Keeping Track
 Subject: Increased use of tables and graphs in memos

We've completed our analysis of the increasing frequency of tables and graphs in memos. Department usage is rising slowly, limited only by the memo writer's ability to understand what ought to be in a table and how to pick the right type of graph to use in illustrating the important part of the data. The big jump in the last three days' count includes the eighteen drafts our department circulated prior to finalizing *this* memo.



Our baseline is an average of approximately eight memos per day with neither tables nor charts. We hope this clarifies the issue.

MEMOS WHICH INCLUDE				
	Tables	Charts	Both	None
Monday	1	0	0	8
Tuesday	3	2	1	8
Wednesday	6	4	3	6
Thursday	10	8	7	7
Friday	12	8	6	9

Next week we will have a report on the use of varying fonts and type sizes in memos and our first statistical study of where users place tab stops.

DOS, such as GEM and Desqview, power user shells like The Norton Commander and HP's own PAM all compete for the user's attention. The recent deal to make the GEM developer's kit available under Windows is an indicator of the volatility of the situation.

■ Most software vendors developed a look and feel for their products before the "operating environment" issue arose and are resistant to abandoning an experienced user community for an environment that will make them look more like their competitors.

■ Most applications are purchased according to how well they perform their principal function, not how well they work with unrelated packages. As the user community refocuses on

work-group automation, this may change. HP is betting it will.

■ Windows is not compatible with existing RAM-resident programs. Because it manages the screen and memory for the programs that run under it, there's too much conflict with the nature of RAM-programs. NewWave may transcend the sales problems of Windows. NewWave creates an environment that goes beyond any similarity of appearance to Macintosh icons and pop-up windows scrolled by elevator bars.

Features Unique To NewWave

NewWave introduces the concept of the Object Manager and the Agent. The Object Management Facility gives a program the ability to "contain" another

program as a component. The Agent allows routines to run when work needs to be done, not just when requested by the user. NewWave doesn't allow two programs to execute at the same time, it allows two programs, not necessarily on the same computer, to exchange information.

To understand how this works, let's go back to desktop publishing applications and look at a compound document. The typical example quoted of a compound document is a memo containing a small table of values, the chart derived from them and the text of the memo that discusses the material. A sample memo is shown in Figure 1. The often overlooked element of the compound document is the structure that ties it all together. The example in this article was produced on a Macintosh using Microsoft Excel and Word. The identical document could have been prepared on a Vectra using Microsoft Excel and Word running under Windows.

Numeric data was entered into spreadsheet cells. The spreadsheet then prepared a chart. The word processor was used separately to write the memo discussing the text. A style sheet for company memos provided the template for the overall appearance of the document. To make the final printed memo, the appropriate areas were copied from the spreadsheet cells and from the chart and pasted into the word processor file. The document also could have been prepared with Ventura Publisher, HP Graphics Gallery and Lotus 1-2-3.

The limitation of this capability is its snapshot approach. The linkages are not dynamic. If there's a need to change the data after the memo has been prepared, the whole process will be repeated, although fewer steps will be required. First, change the affected spreadsheet cells, generate a new chart and repaste into the memo. Using new applications that could be developed with NewWave, the table and chart would be active spreadsheet and charting applications imbedded within the document. Editing the table would automatically redraw the chart. The

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Norton Commander
Peter Norton Computing
2210 Wilshire Blvd.
Santa Monica, CA 90403
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NewWave user would work directly with the information content of the document. The document would respond to the user. The best example of how this works today is to look at Xerox Viewpoint.

Another quality of NewWave is that it is not limited to the composition of compound documents. An integrated

up all night?



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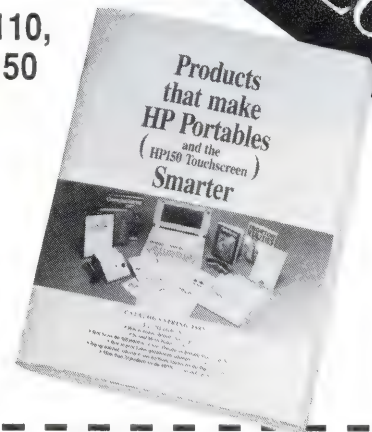
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Choose Option 7 from DBGENERAL's main menu to select STORBASE . . .

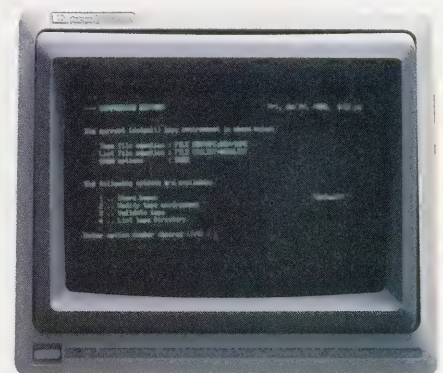
Brad and Morgan have just agreed to make life a lot simpler for thousands of IMAGE users. They've decided to add the high-speed, compressed backup technology of BackPack to DBGENERAL, with a new DBGENERAL module called STORBASE™.

A little bit of BackPack in every byte.

STORBASE uses BackPack's high-speed file access and parallel processing techniques to harness CPU power normally unused during store operations. So like BackPack, STORBASE can reduce backup time by up to 35% or more on high-speed tape drives and 50% or more on 1600 BPI models. What's more, STORBASE applies BackPack's data compression algorithm and uses its revolutionary tape format to cut tape requirements in half. And unlike HP's DBSTORE, STORBASE lets you back up all your databases on a single tape or tape set. (DBSTORE requires a separate tape for each one.) The ability to back up any number of databases on one tape set further reduces tape use and storage requirements, while vastly simplifying data center operations. And because STORBASE resets the "dirty bit" and updates the date

and time stamp in the root file of each database stored, it is fully compatible with HP's transaction logging and recovery facilities. Just as with DBSTORE, you can start a new log cycle after each backup.

If you're concerned about disaster recovery and/or sharing data with installations that don't use either STORBASE or BackPack, you'll be pleased to know that STORBASE tapes can be restored on any HP 3000, using the restore module conveniently placed at the front of each tape set.

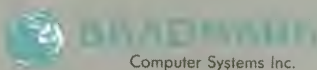


Then simply enter the names of your databases and mount a tape.



The bottom line.

As a user of Bradmark's DBGENERAL product, you can add the STORBASE module for just \$1500 (less any multi-copy discount earned). If, within one year after purchasing STORBASE, you decide you would like to extend



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database backup problem.

the power of BackPack to all your backup procedures, you can purchase BackPack from Bradmark, receiving full credit for your STORBASE purchase toward the price. With BackPack you can back up all types of files, instead of just databases. You can take advantage of BackPack's unique unattended backup facility, which lets you

store all your data in compressed format to a disc file during the night, then copy it off to tape the next day. Other BackPack features include support for backup on multiple tape drives, integrated SYSDUMP, automatic purge after store, the ability to run batch reporting jobs concurrent with

backup, and many more.

Call the Bradmark office nearest you to purchase STORBASE. If you are interested in BackPack and are not currently using DBGENERAL, call Tymlabs.

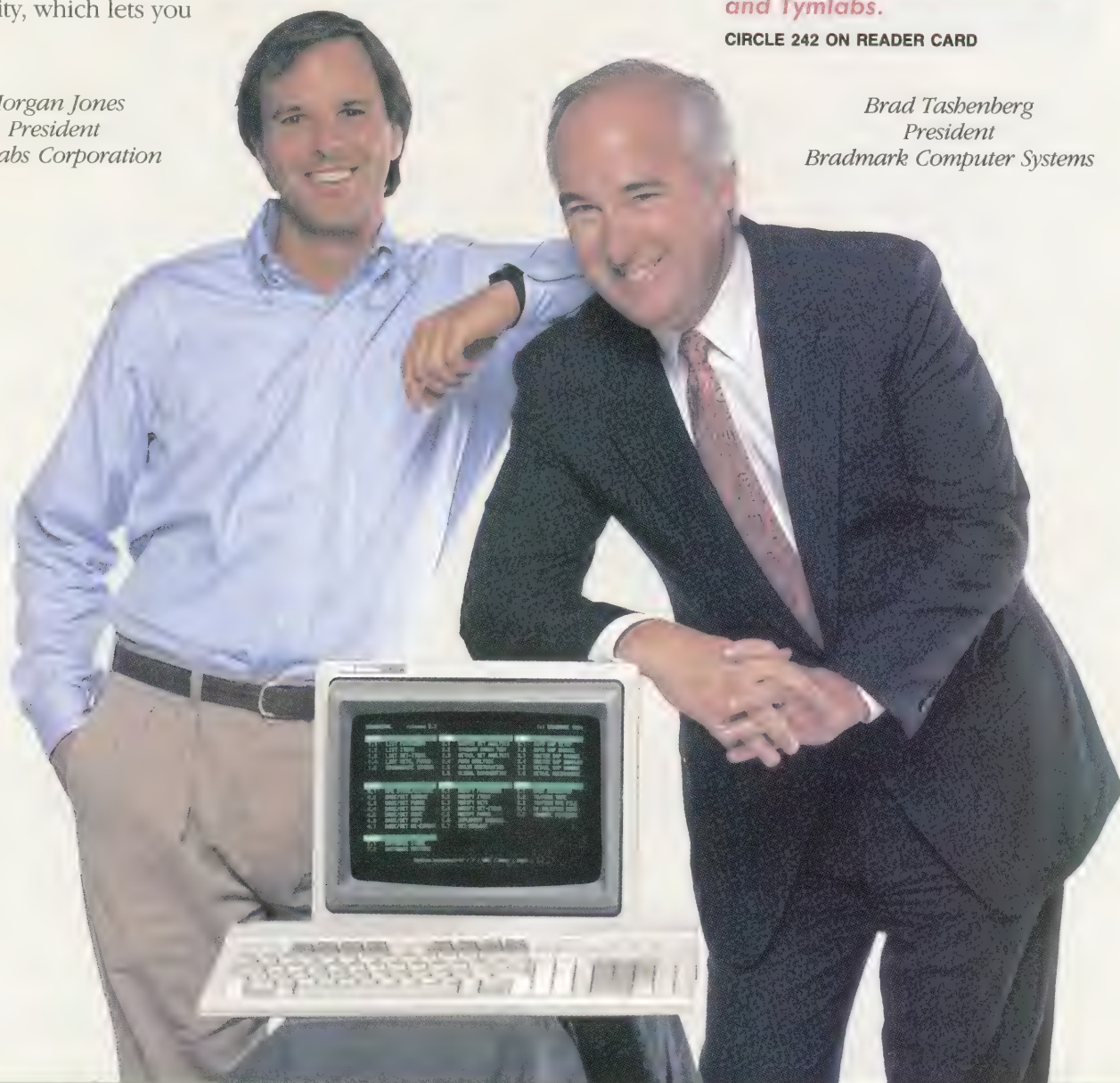
When good people work together, good things happen.

STORBASE. From Bradmark and Tymlabs.

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NewWave

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System Requirements: HP Vectra ES
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20-MB hard disc drive, minimum
High Density (1.2MB) flexible disc drive
Monochrome Monitor, Multimode
Mouse
MS-DOS 3.2
Microsoft Windows 2.0
Microsoft Windows 2.0 Software
Development Kit
Microsoft C Compiler
Price: \$895

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accounting system with multiple modules posting to each other and generating reports when they are needed is a natural application of NewWave. Thus there are several answers to the question posed at the beginning of this article: Should Vectra owners look at

Apple products or wait for NewWave? If your needs for user productivity are immediate, NewWave can't do much for you and a multiprogramming tool like Desqview might help.

Future Considerations

If you are planning for the future, NewWave can be a major environment for developing work-group software. Keep in mind that NewWave and the alternatives cannot be assessed in terms of what they do on one machine or for one person. Their impact is corporate wide. There are other considerations. First, NewWave will protect an existing investment in PC and Vectra computers, but will require large memory capabilities (2.5 MB and up) and discs bigger than the 20-MB models found on most installed Vectras.

Second, Apple probably will implement features similar to NewWave in future releases of Macintosh software. Their Multifinder already performs

limited multiprogramming. Minimum memory required for the Macintosh is expected to climb to 2 MB within a year, then to 4 MB.

Third, Xerox Viewpoint is being updated and implemented by Xerox on other hardware, specifically the Sun workstation family. Prices of such machines are expected to drop in the future as technology improves and sales volume rises. In three years, all vendors probably will be in the same place. The cost in 1992 to upgrade a Vectra to run NewWave, purchase a new Vectra Super Zinger 99000, buy a Macintosh V or Xerox Scenic Viewpoint will be the same. The functions will be equivalent, and (wow!) they might even talk to each other! — Ashley Grayson is the founder of ADG, a market and product analysis organization based in San Pedro, CA.

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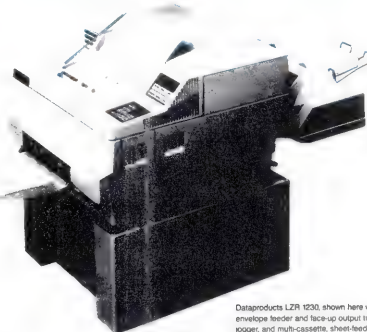
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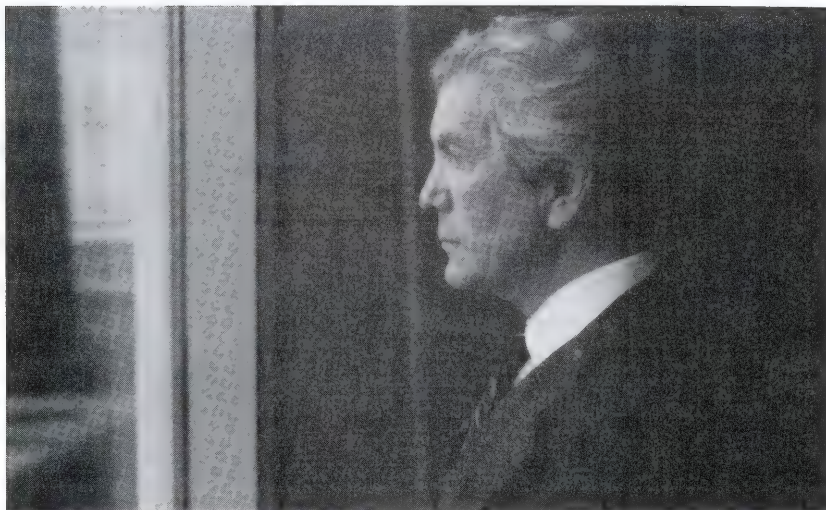
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Mitchell Humphrey and Co. software is designed exclusively for Hewlett Packard 3000 and Spectrum series mini-computers.

Continued from page 24.

SAS/FSP software's letter-writing facility.

SAS/ASSIST software was developed using the screen control language of SAS/AF software, the applications development component of the SAS System.

SAS/ASSIST software now is being shipped free of charge to all current SAS Institute PC sites. It also will be distributed free to new customers licensing base SAS software under PC-DOS and MS-DOS. Future releases of the SAS System for mainframes and mini-computers also will include SAS/ASSIST software.

Contact SAS Institute Inc., SAS Circle, Box 8000, Cary, NC 27512-8000; (919) 467-8000.

Circle 396 on reader card

STR Introduces FAX/3000 For Data Transmission

STR Software Company recently introduced FAX/3000, a product that allows documents on the HP 3000 to be sent to facsimile machines.

FAX/3000 transmits easy-to-read facsimiles because the text is digitally processed. FAX/3000 also allows transmission of facsimiles directly from a Hewlett-Packard terminal instead of printing the document first and then feeding the facsimile machine manually.

FAX/3000 can transmit most Hewlett-Packard document formats. High quality facsimiles are created with the merging of text created on the HP 3000 with company logos, user signatures and special forms.

FAX/3000 provides transmission logs in both hardcopy report and interactive formats. Status messages are displayed in real-time to the system console or an alternate terminal or printer.

Contact STR Software Company, PO Box 12506, Arlington, VA 22209; (703) 689-2525.

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MasterLink Introduced By InfoMetrix

MasterLink, a file transfer and communications program for the Hewlett-Packard 9000/300 computer, has been released by InfoMetrix.

Pull-down shadowed menus, dialog boxes and on-line help improve a user's learning curve. X and Y MODEM protocols are supported, so you can move files between

9000/300 and IBM PCs, VAX systems and others. BATCH transfers are done using simple point-and-shoot routines.

MasterLink (\$495) includes two discs, a cable and a manual.

Contact InfoMetrix Inc., 2200 Sixth Ave., Suite 833, Seattle, WA 98121; (206) 441-4696.

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Zyxomma Releases RETRIEVER For HP 1000

Zyxomma has announced the release of RETRIEVER, a free text retrieval database facility for the HP 1000A Series of super-minicomputers.

RETRIEVER is designed to handle unstructured information that does not conform easily to conventional field and record structuring. From one or more information databases the user is able to search and retrieve specific information by topic.

Retrieval performance is usually less than five seconds, regardless of the amount of information held in the database. RETRIEVER also supports refined searches for greater selectivity and provides logical connectors (AND, OR, NOT) for complex searches. RETRIEVER also may be called from a user-written program.

The next release of RETRIEVER will provide support for searching disc-based documents by content. This facility also will include documents produced by CCWORD, the widely used word processing product for the HP 1000.

In addition to RETRIEVER, Zyxomma Ltd. recently introduced FASTNET, a network-independent facility for Hewlett-Packard- and VAX-based networks. Based on the ISO standard for open system interconnection (OSI), FASTNET provides named message pipes and data pools for network-independent distributed processing applications. FASTNET supports full HP block mode virtual terminal facilities to remote network nodes and is designed to provide real-time processing performance with minimum processor memory overhead and a high degree of system reliability.

Contact Zyxomma Ltd., 40 Littledown Drive, Queens Park, Bournemouth, Dorset BH7 7AQ; 0202-35453.

Circle 393 on reader card

Informix 4GL Available On UNIX-Based Systems

Informix-4GL Rapid Development System and Informix-4GL Interactive Debugger, Informix Software Inc.'s fourth-generation language database application development

tools now are available on a number of UNIX-based platforms. These include the Altos 3068; Amdahl 580; AT&T 3B15, 3B2, 3B20, 3B4000 and 6396; Convergent Technologies' Mightyframe; DEC's Microvax 3000, Microvax II and Vaxstation 2000; Hewlett-Packard 9000/800 Series; IBM RT/PC; Intel 386/320; NCR Tower 32/200; Northern Telecom Meridian; Sequent Symmetry; Unisys 5000/90 and 6000/50; and Sun Microsystems 3 series.

Informix-4GL Rapid Development System (RDS) reduces database application development time by compiling 4GL code into Informix's proprietary "p-code," or pseudo code. The p-code runner, a module included in the product, then can be used to run the p-code, eliminating the need for a C compiler and C linker (unless a developer chooses to use C routines). Informix-4GL RDS is a complete fourth-generation language that supports windows, color and multiple-page menus.

Informix-4GL Interactive Debugger provides fast, interactive debugging capabilities for Informix-4GL RDS programmers. The debugger uses "hot keys" to allow a programmer to switch between a running program and a windowed screen that provides an "x-ray vision" view into the running program.

Contact Informix Software Inc., 4100 Bohannon Drive, Menlo Park, CA 94025; (415) 322-4100.

Circle 389 on reader card

Intelware Releases SPEEDTEST/3000 V1.2

Intelware Systems Ltd. has released version 1.2 of SPEEDTEST/3000, a testing tool specifically designed for TurboImage databases.

The software eliminates the need to create and maintain test databases. SPEEDTEST/3000 also includes a trace facility and new access modes to the databases. These features facilitate the validation process of the newly created or modified program.

Version 1.2 integrates all the commands and programs that constitute the software under a new shell program. This shell includes an on-line help subsystem. Also with this new version, programmers now can use the software from any account on their system.

SPEEDTEST/3000 is priced at \$2,500 for the first copy license.

Contact Intelware Systems Ltd., 216 Cote, Repentigny, Quebec, Canada, J6A 1E8; (514) 653-8242.

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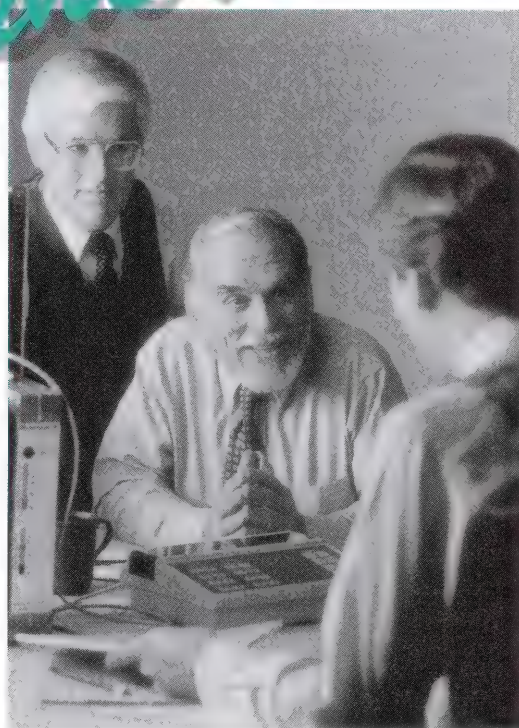
These one-day, seminar/displays are so popular because they give you just what you need to know without wasting your time or money. You don't travel, there's no admission fee, the seminars and table-top displays from major manufacturers are all targeted to your interests (no searching through aisles), and the atmosphere is informative and hands-on, but congenial, with refreshments served. In a few hours you'll have the latest story on the newest and best in disk and tape drives, controllers, terminals, printers, test equipment, etc.

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CIRCLE 222 ON READER CARD



1988/89 OEM Peripheral Series U.S./Canada Locations

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Minneapolis, MN	Oct. 20, 1988
Westlake Village, CA	Oct. 25, 1988
Dallas, TX	Dec. 8, 1988
Irvine, CA	Jan. 5, 1989
Ft. Lauderdale, FL	Jan. 24, 1989
Seattle, WA	Feb. 21, 1989
San Jose, CA	Mar. 16, 1989
Raleigh, NC	Mar. 28, 1989
Toronto, Canada	Apr. 18, 1989
Nashua, NH	Apr. 24, 1989

European Locations

Frankfurt, W. Germany	Sept. 15, 1988
Stockholm, Sweden	Sept. 20, 1988
London, England	Sept. 27, 1988
Munich, W. Germany	Jan. 19, 1989
Milan, Italy	Jan. 26, 1989
Paris, France	Jan. 31, 1989



IOtech Introduces Serial488/4 Interface

Users of IEEE-488 based test systems can control up to four RS-232 or RS-422 devices through IOtech's new Serial488/4 interface.

Serial488/4 is a four-channel IEEE-to-serial converter that enables an IEEE controller to command up to four bidirectional RS-232 or RS-422 devices. It provides the ability to integrate IEEE and RS-232/422 devices in one system. Serial488/4 is a solution for systems configured with a Hewlett-Packard controller or any IEEE controller that does not have a serial port for connecting RS-232/422 devices.

The user can configure individually each of the four serial channels for such parameters as baud rate, word length, stop bits and parity. Configurations are stored in the unit's non-volatile memory, so that the stored setup is not lost once the unit is turned off. The IEEE controller can read the status of each channel and determine the number of characters received on the serial port and the status of any error conditions for that channel.

A 64K RAM on the Serial488/4 is allocated for use as a buffer for all the serial ports. Handshaking on the serial ports, either XON/XOFF or CTS/RTS, automatically inhibits serial devices from sending more characters when the data buffer is full.

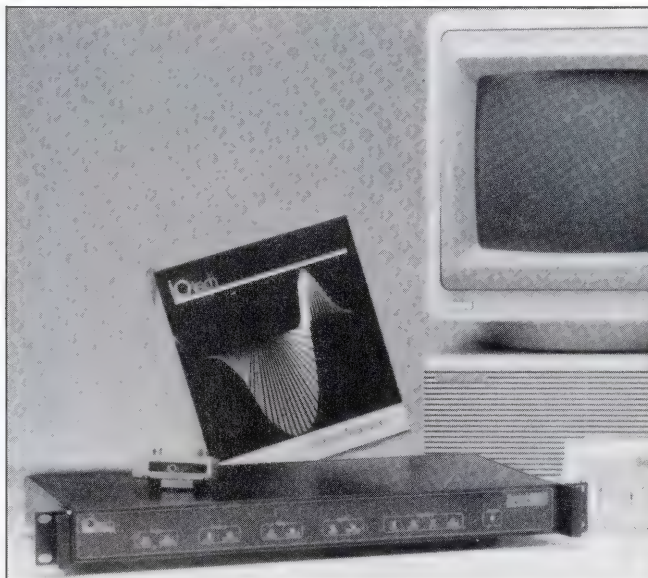
The Serial488/4 (\$995) is packaged in a full-rack case. Contact Tom DeSantis, IOtech Inc., 25971 Cannon Road, Cleveland, OH 44146; (216) 439-4091.

Circle 397 on reader card

IDE Ships Release 4.0 Of CASE Product Line

Interactive Development Environments (IDE) recently began shipping Release 4.0 of its Software through Pictures computer-aided software engineering (CASE) product line. Software through Pictures is an integrated multiuser environment using modern methods to support the entire software development process. Release 4.0 includes user-extensible applications addressing productivity, control and communication issues.

A new range of applications has been created using Software through Pictures' Visible Connections templates, which drive the new tools to provide such solutions as automatic documentation, requirements traceability, DOD-STD-2167 support and data dictionary analysis. The user can extend or customize any application by editing or



Serial488/4 is a solution for systems configured with a Hewlett-Packard controller that does not have a serial port for connecting RS-232/422 devices.

creating a template.

New tools that make Software through Pictures applications possible include a template-driven document preparation system. The "point & click" interface lets the user select a document definition from a library of templates and edit user-definable fields. Finally, the user generates the document on a laser printer that supports PostScript or device independent Troff. The document preparation system also can interface to such desktop publishing systems, including Interleaf.

SQL schema generation is supported by a new data definition language used by the entity relationship editor. By enabling the creation of SQL schemas, database designs can be tested and revised. New data definition language templates include support for DB2, Informix, Ingres, Interbase, Oracle, Sybase and Troll/USE. Existing BNF data descriptions may be reverse engineered in Release 4.0 to create data structure diagrams that are compatible with Software through Pictures so that older designs may be supported. Additional symbol support includes Booch's notation for Ada tasks, packages and programs (in Software through Pictures' PICTURE object-oriented drawing tool); the structure chart editor now supports three new symbols, including lexical inclusion, common data and update data.

The new object annotation editor provides a template-driven "fill-in-the-form" method of attaching properties and descriptive text to any object. Any object can be defined fully. The data dictionary has been modified to allow identification of objects; an object identifier, an optional object name

and an object type have been added.

Software through Pictures Release 4.0 has been in beta test at fifteen sites since May. It is available for all major workstations including those manufactured by Apollo, DEC, HP and Sun, and is fully integrated with the windowing system and tools of each host workstation. Prices range from \$5,000 to \$21,000, depending on the selected configuration. Corporate pricing and university discounts are available.

Contact IDE, 595 Market Street, 12th Floor, San Francisco, CA 94105; (415) 543-0900.

Circle 390 on reader card

Orion Systems Releases STARPRINT For HP 3000

Orion Systems Technology Inc. has announced STARPRINT, an HP 3000-based system for controlling and printing files destined for slave printers attached to PCs and terminals equipped with printer ports. Remote users can make a single port serve for normal transaction processing and also utilize it for an attached printer. High quality printing of HP 3000 files is an added benefit if the attached printer is a laser or other letter quality printer.

STARPRINT has options that let the creator determine whether printing a particular file is restricted to the creator, all users in a group or to all users in an account.

STARPRINT (\$995) includes 12 months of software support and updates. Contact Orion Systems Technology Inc., 325 El Dorado, Suite 102, Mesa, AZ 85202; (602) 894-6983.

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Efficient all Character Compression			yes
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Reasonable Software Support Fee			yes
Regular Distribution of Enhancements			yes
Private Volume Support			yes
LAN/DS Network Support			yes
Considerable Customerbase			yes
Substantial Time and Tape Savings			yes
Append to End of previous Backup Set			yes
Multiple Tape and Disc to Disc Backup			yes
User Selectable Compression			yes
Automated Functions			yes
Restore on any HP 3000 System			yes
Wild Card, File and Date Selection			yes
User Access during Backup			yes
Full Operation with MPE-V/MPE-XL			yes
Easy to Install, Easy to Use			yes
HP Response Center Support (*)			yes

* currently West Germany only

Quite simply look at the results. Even if you have answered just one NO, you should talk to HI-COMP.

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CIRCLE 146 ON READER CARD

NEW PRODUCTS

Carolian's Spooling Utility On Spectrum

Carolian Systems International Inc. has released the B.01.00 version of OMNISPOOLER/INFONET, one of the first of Carolian's utility software products to be migrated to the Spectrum. This new version of OMNISPOOLER/INFONET is compatible with both the MPE operating system of the classic 3000 and the operating system of Spectrum.

OMNISPOOLER/INFONET, utility software designed to improve the standard MPE spooling capabilities of HP 3000 computer systems, has been enhanced to provide several features. One addition to OMNISPOOLER/INFONET is a user interface for those users wanting to manage the operation of OMNISPOOLER/INFONET from a character mode, rather than a block mode terminal.

New features of the OMNISPOOLER module include increased capacity for resuming printing, with the ability to print forward and backward from anywhere between 1 and 9,999 pages; the option to enable or disable the page eject prior to printing; and the flexibility to set the outfeed on one or more individual printers either through MPE or through OMNISPOOLER. With the new OMNISPOOLER you also can display useful spool file information such as a spool file name, the user and account that spooled the files, the status of the file, the special form name, the number of copies to be printed and the number of lines in the file.

The INFONET module now has its scheduling feature in place, providing users with the ability to specify when spool files can and cannot be sent from one machine to another.

Carolian's Systems' other offerings include: GALCON, which provides centralized control and management of a multiple 3000 environment; SYSVIEW and SYSPLAN, performance optimization and resource planning tools; CALC1, a spreadsheet package; and INTACT, a database-integrity utility.

Contact Carolian Systems International Inc., 3397 American Drive, #5, Mississauga, Ontario, L4V 1T8, Canada; (800) 263-8787.

Circle 275 on reader card

Programming Power For Non-Programmers

Now non-programmers can create their own programs with the Clarion Personal Developer, recently released and now being shipped by Clarion Software Corporation.

The Personal Developer is a standalone product that allows you to create and run full-featured applications.

Application programs produced with The Personal Developer routinely can include features such as point-and-shoot menus, scrolling data tables, pop-up data entry forms, look-ups, computed fields and "hot key" procedures.

The Personal Developer comes with eight ready-to-run application programs. These may be used "as is" or modified to match individual requirements. They also may be used as sample programs or models for entirely new ones. The sample programs include applications such as ORDER, an order-entry and invoicing program; TRACKING, a program to track sales leads, customers and products sold; and MEMBERS, a membership and list-management program.

Programs produced with The Personal Developer may be enhanced when processed by Clarion Software's flagship product, The Professional Developer. Through this process, additional capabilities can be added such as complex application code written in Clarion, C or Assembler; LAN support; and advanced file management techniques such as transaction processing and file encryption.

The Personal Developer generates and compiles Clarion language source code from application specifications produced by the user. The user observes "programming" and compiling taking place when executing application programs for the first time.

The Clarion Personal Developer requires an IBM PC, XT, AT or PS/2 or 100 percent compatible, PC-DOS or MS-DOS 2.1 or higher, 512K RAM (640K is recommended), a double-sided floppy disc drive and a hard disc. The Personal Developer has a suggested retail price of \$169, with an introductory price of \$139.

Contact Clarion Software Corporation, 150 E. Sample Road, Pompano Beach, FL 33604; (305) 785-4555.

Circle 387 on reader card

NSD Releases SpoolRescue For HP 3000 Users

NSD Inc. recently has released SpoolRescue, a high-performance spoolfile utility with capabilities previously not available to HP 3000 users.

Features of SpoolRescue include the ability to view open spoolfiles, access to input spoolfiles, fast archive to disc to clear the spool system and selectively restore reports and stream jobs (including scheduled jobs), microfiche tape creation facility and spoolfile

selection on a wide variety of parameters.

Three-week demo versions are available at no cost to any company wishing to test SpoolRescue's capabilities in their own environment.

Contact NSD Inc., 1670 South Amphlett Blvd., Suite 103, San Mateo, CA 94402; (415) 573-5923.

Circle 386 on reader card

PacSoft Releases New DOS Version

Arnold L. Zirkle, director of marketing at PacSoft Incorporated, recently announced the release of PacSoft's new DOS version of its engineering and surveying software developed for PC-compatible computers.

PacSoft's new PC version introduces complete design functionality for PC computers. Previously available for higher performance Hewlett-Packard workstations only, PacSoft has reengineered all existing functionality for application delivery on the Intel 286- and 386-based personal computers.

Formerly written in Hewlett-Packard's Rocky Mountain BASIC, the PacSoft solution now offers an integrated line of software for terrain modeling, roadway/highway design, automated contour mapping, earthwork volume calculations, surveying, coordinate geometry, subdivision design, storm water hydrology and automated drafting. Contact Erin Vaughan, PacSoft Incorporated, 825 5th Ave., Suite 100, Kirkland, WA 98033; (206) 827-0551.

Circle 385 on reader card

Jobscope Introduces Version 8

Jobscope recently introduced Version 8 of its manufacturing management software system. Two of the major enhancements are the addition of the Engineering Change Notice (ECN) and EXRay systems.

The ECN system provides the capability to have the system recognize and report changes to the Engineering BOM catalog. The system recognizes three types of circumstances, a global change, directing any reference to Part A to Part B; a "where-used" change, substituting Part B for Part A on those assemblies specified; and a change effective on a certain future date, adding Part B to the assembly while retaining Part A.

The system will assign Part B if the date of the transaction is on or subsequent to the date entered as the effective date of the change.

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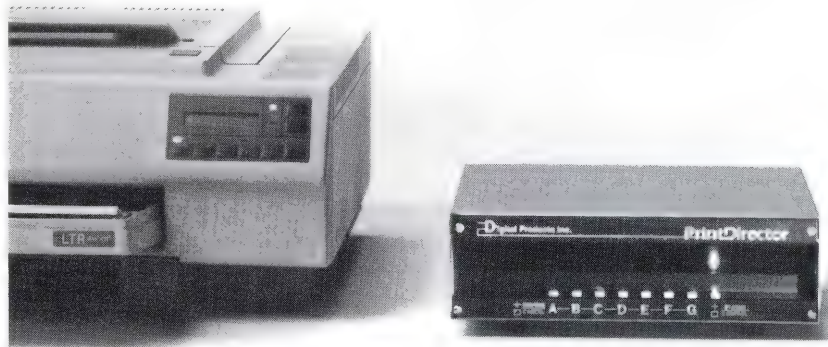
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Contact Kathryn Heckelmann, Jobscope Corporation, 355 Woodruff Road, Highland Park, Box 17, Greenville, SC 29607; (803) 234-4851.

Circle 274 on reader card

Function Keys For PowerHouse

KC Software recently announced Function Keys for PowerHouse.

Function Keys (\$95) provides the system developer with access to programmable function keys and allows each screen to have multiple sets of keys. The key labels and functions are maintained in a file by a Quick screen; therefore, screens do not have to be

recompiled when the function keys are modified. Each key function can hold multiple Quick commands, helping the application to run more efficiently.

Contact KC Software, P.O. Box 215, Shillington, PA 19607; (215) 775-5347.

Circle 383 on reader card

New Release Of Presentation Graphics

Arens Applied Electromagnetics has announced Release 5.0 of its Presentation Graphics business graphics package for minicomputers. Presentation Graphics is a presentation-quality, standalone, minicomputer-based business graphics package that has been available on the HP 3000 for over 8 years.

This release contains new features including automatic construction and placement of datatable under bar charts; high, low and close ability for line charts; user positioned labels for the X and Y axis; more flexible use of external data files; chart destinations specified as a logical device number,

number, device class or file name (on disc, tape, or the actual device); more consistent error handling and more precise error messages; and support for the HP Jet printers including the PaintJet and support for the HP RuggedWriter.

Contact Arens Applied Electromagnetics, P.O. Box 329, Gaithersburg, MD 20853; (800) 882-4428, or (301) 258-0970.

Circle 384 on reader card

Giltronix Announces EZQ Laser II For LaserJet II

Giltronix Inc. has announced EZQ Laser II. The new product is a buffered printer sharing device available for the HP LaserJet II, featuring serial data transfer speeds as high as 57,600 baud.

EZQ Laser II offers 256KB of buffer, expandable to 1.25MB; "DataSafe," a new proprietary error detection/correction feature; four high-speed serial ports; one parallel port; and installation software that automatically configures your system.

EZQ Laser II (\$495) is available and

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CIRCLE 130 ON READER CARD



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The Graphics Gallery demonstration copy runs on IBM PC/ATs and XTs, Vectra PCs, and most compatibles with an EGA or monochrome monitor with Hercules™ graphics card. Lotus® 1-2-3® is a registered U.S. trademark of Lotus Development Corp. Hercules™ is a trademark of Hercules Computers.

shipping today. Giltronix offers current EZQ Laser owners an upgrade path to the new product for \$100.

Contact Diane Rizzo, Giltronix Inc., 1430 O'Brien Drive, Bldg. D Menlo Park, CA 94025; (415) 853-1800.

Circle 382 on reader card

Tymlabs Announces New Products/Upgrades

Tymlabs Corporation has announced Version 3.1 of its Session family of HP terminal emulators for Macintosh: Business Session, an HP 2392 block mode emulator; Graphic Session, an HP 2393 monochrome graphics emulator; and a new product, Color Session, which emulates the HP 2397 color graphics terminal.

Color Session for Macintosh is an HP 2397 color graphics terminal emulator. Color Session supports HP terminal functionality through a Macintosh interface.

Color Session (\$399) provides full colorization of text graphics and speeds color

graphics development with interactive color manipulation. Advanced capabilities include up to 16 color palettes, emulation of dithered area fill patterns with pure Macintosh colors, HP pens and draining modes and color selection via escape sequence or dialog box.

Tymlabs also has announced the release of a Precision Architecture version of Backpack. Like Backpack/V, Backpack/XL uses high-speed file access, parallel processing and data compression to reduce the time and tape required for backup and to provide an unattended backup solution.

The MPE/V and MPE/XL versions of Backpack use a single tape format. This means that tapes created on a classic HP 3000 with Backpack/V can be restored on a 900 Series system and store tapes created with Backpack/XL can be restored on a classic HP 3000. This is useful not only for migration purposes but also for disaster recovery. With HP STORE/XL, only tapes created with the TRANSPORT keyword can be used for disaster recovery on a "classic" HP 3000.

Backpack/XL is priced at \$4,000 on the Series 925, \$6,000 on Series 930 and 935 and

\$8,000 on Series 950 HP 3000s.

Tymlabs and HPS Software Developments Limited (London, England) have announced Business Session for Windows, a Microsoft Windows-based HP 2392 terminal emulator for IBM PCs, HP Vectras and compatibles. Business Session provides block-mode terminal operation, intelligent file transfer, automated command scripts and a logging facility within the "desktop" environment afforded by Windows 2.0, Windows/286 or Windows/386.

Through the end of 1988, Business Session for Windows (including a run-time version of Microsoft Windows) is available at the introductory price of \$99. Beginning in 1989, the single-copy price will be \$199. Contact Tymlabs Corporation, 811 Barton Springs Road, Austin, TX; (512) 478-0611.

Circle 378 on reader card

Visible Systems' Primer On CASE

The first of several Primers covering the basics of structured analysis as used in Computer-Aided Software Engineering (CASE) or workbench tools has been produced by Visible Systems Corporation.

The new CASE Primer, provides an introduction to the symbols, terminology and methodology used by workbench tools in the analysis, design and programming of new software systems.

Covered in the Primer are the basic principles involved in structured analysis: data flow diagrams, use of structured English and application of expert rule sets. Also included is a glossary containing application-oriented definitions of key terms.

Contact Visible Systems Corporation, 49 Lexington Street, Newton, MA 02160; (617) 969-4100.

Circle 276 on reader card

HP Introduces Two New Calculators

Hewlett-Packard recently introduced the HP-14B business calculator and HP-42S RPN (reverse Polish notation).

HP's RPN entry system eliminates the use of parentheses or an equal key. Values are entered into a memory stack before an operation is executed. The HP-14B features two-variable statistics with linear regression for statistical analysis, four curve-fitting models for forecasting and list-based cash flows. Contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.

Circle 372 on reader card ■

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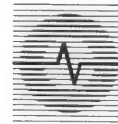
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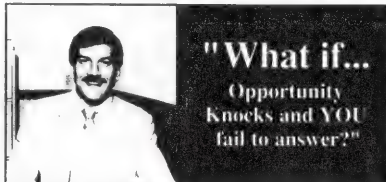
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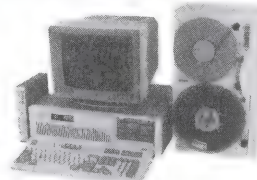
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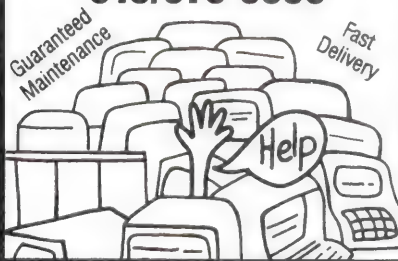
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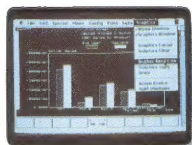
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